



FRIDAY, OCTOBER 13, 1899.

## CONTENTS.

ILLUSTRATIONS:	PAGE	GENERAL NEWS:	PAGE
Metal Draft Beams .....	703	Car-Building .....	716
Sargent's Automatic Semaphore .....	706	Bridge Building .....	716
Handling Ballast on the Michigan Central .....	708	Meetings and Announcements .....	717
Westinghouse Electro-Pneumatic Motor Control and Baldwin Trucks .....	708	Personal .....	718
CONTRIBUTIONS:		Elections and Appointments .....	718
A Fault in Trestle Design. 703		Railroad Construction .....	718
Two Mills per Ton-Mile .. 703		General Railroad News .....	720
EDITORIALS:		Traffic .....	720
Metal Draft Beams .....	712	MISCELLANEOUS:	
Annual Reports—Reading. 712		Technical .....	714
EDITORIAL NOTES. .. 712, 713		The Scrap Heap .....	714
GENERAL NEWS:		American Locomotives in Sweden .....	714
Locomotive Building ... 716		New York City Traffic on Dewey Day .....	710
		Some of the Problems in Train Braking .....	711
		American Society of Railroad Superintendents .....	713
		The Automobile in France. 714	

## Contributions.

## A Fault in Trestle Design.

New York, Oct. 6, 1899.

To the Editor of the Railroad Gazette.

The plan of the wooden trestle bridge of Thomson Run at Duquesne, Pa., published in your last issue, shows one antiquated and faulty detail constantly recurring in such constructions. This is the use of mortise and tenon instead of simple iron dowel pins for the connection of cap to posts. The cap should be rigidly held in place by extending the diagonal braces and bolting them strongly to the cap. The bearings should be on the full cross-section of the post, as the bearing value is limited by the smaller crushing strength of the timber across the fibre in the cap, and not by the crushing strength of the post; the reduction of the bearing area by a mortise hole is considered poor practice. That connection is usually the place where the trestles show the first signs of failing under heavy loads.

CIVIL ENGINEER.

## Two Mills per Ton-Mile.

Oct. 7, 1899.

To the Editor of the Railroad Gazette:

In your last issue (Oct. 6) I notice a quotation from the report of President Ashley of the Wabash, in regard to phenomenally low rates per ton-mile reported by a certain road. Possibly this refers to recent reports from the Chesapeake & Ohio, on coal. While not connected with the road, I have a general acquaintance with its physical features. Ought not some notice to be taken of the important fact that in its James River Division (the old Richmond & Allegheny) the Chesapeake & Ohio has a route which practically ranges between a dead level and a down grade from Clifton Forge to Richmond, and thence eastward to Newport News, its grades are very light? This covers a large part of the route over which the coal is carried from the mountains to the sea. Similarly the grades up the New and Greenbrier rivers are very light. These facts, I judge, have an important bearing on the subject noted, though they may not fully account for the statements criticised by Mr. Ashley.

It may not be inopportune to refer to them also as illustrating the views presented by Mr. Wellington in his work on location. The James River Division, though following the windings of the James, with all its bends, large and small, thereby greatly increasing distance, and including many sharp curves around bluffs and river bends, still shows its superiority in point of grade to be worth more than all the sacrifice of distance and alignment.

SUBSCRIBER.

## A Round Iron Tank Hoop.

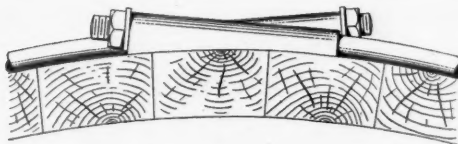
Chicago, Ill., Sept. 26, 1899.

To the Editor of the Railroad Gazette:

In your issue of July 28, the comparative value of steel and wood tanks for railroad water stations was discussed, and Mr. Snow, of the U. S. Wind Engine Co., called attention to the corrosion of the hoops of wooden tanks at the joints between the staves, and states that the life of the hoop is less than that of the wood.

In this connection it may be noted that a vinegar and pickle company of Chicago has adopted a form of hoop for its 100,000-lb. tank cars which might be of service in water tank construction. For handling vinegar it is evidently necessary to use wooden tanks

and these people have probably been troubled with corrosion of hoops. The hoop they use is of round iron. This presents the smallest possible surface for corrosion and has a very small area in contact with



A Round Iron Tank Hoop.

the wood. The hoop fastenings are cast or pressed steel pieces of simple form (as shown by the sketch) through which the ends of the hoops pass and are drawn tight by nuts. All things considered this hoop seems less expensive and just as efficient as a strap hoop, and surely less liable to corrode. If this form of hoop should cause trouble by catching water on the upper side next to the tank, that space might be filled and painted over.

S.

## Metal Draft Beams.

## General Discussion.

With from 60 to 70 per cent. of all the cars on the repair track standing there on account of defects in some portion of the draft gear, there is reason to believe that this particular feature of car construction has not kept step with the progress in other directions. The records of the M. C. B. Association show that whenever, as the results of service, weakness has developed in details of car design, those parts have been made subjects of careful investigations for the purpose of securing better construction. A few years ago the principal trouble with draft gears was caused by defective couplers or weak draft riggings, but the former have recently undergone important revisions. And the M. C. B. recommended draft rigging, while it has been materially strengthened from time to time, has now been surpassed by special designs of superior strength and durability. It is an open question, however, whether the draft timbers, which usually form the connection between the draft rigging proper and the car body, have received the necessary attention, in line with the improvements in couplers and draft riggings.

Although several railroads are satisfied with pine draft timbers of the M. C. B. dimensions,  $4\frac{1}{2} \times 8$  in., oak of that size is more commonly used, while on some roads the standard size has been increased in width to 5 in. and even to  $5\frac{1}{2}$  in. Where still more strength has been desired, recourse has been



Fig. 9.—Wrecked Steel Car with the Westinghouse Friction Buffer-Coupler and Draft Rigging Uninjured.

had to metallic draft beams, especially so when durability has been aimed at.

In the Railroad Gazette of June 2, a paper before the Texas Railway Club, by Mr. J. R. Cade, was reviewed, the subject of which was metal draft gears with special reference to the design in use on the Texas & New Orleans, a part of the Southern Pacific system. That paper contained some interesting figures bearing on the subject of metal draft beams in general and their durability compared with

wooden draft beams. It is not the intention now to discuss Mr. Cade's paper, or to take exceptions to his figures. Suffice it to say that the conditions upon which the life of draft timbers depend are regulated by so many circumstances that the figures obtained from the Southern Pacific are by no means to be taken as conclusive, notwithstanding that they are confirmed by other roads presumably in the same territory, with similar climatic conditions, and possibly using the same type of draft rigging and the same size of draft timbers.

While the average life of a freight car on the large Eastern seaboard trunk lines is shorter in years, if not in mileage, than on the Southern Pacific, the average life of the draft timbers is generally considerably longer. On the Pennsylvania Railroad the draft timbers on box cars frequently last as long as the center sills (barring serious accidents), which is equivalent to two sets of draft timbers during the life of the car, assuming the latter to be 17 years. On these cars a set of metal draft beams would then outwear four sets of wooden draft beams, if, as stated in the paper referred to, the metal beams last the life of two cars. Whether or not it would be desirable to apply metal draft beams removed from an old, scrapped car, to a new one, is questionable, as during the course of 17 years a great many improvements would be apt to be brought about, which would make a later design of draft gear preferable.

Aside from this, however, and using actual figures, a set of oak draft timbers should not cost more than \$1.30 per car, mill work and labor included. For 1,000 new cars this would be \$1,300, and, before the cars are worn out, that much again, or \$2,600. Should the same prices prevail after 17 years, it would cost a road twice that amount, or \$5,200, to keep 1,000 cars supplied with draft timbers for 34 years, or as long as the metal draft beams would have lasted,

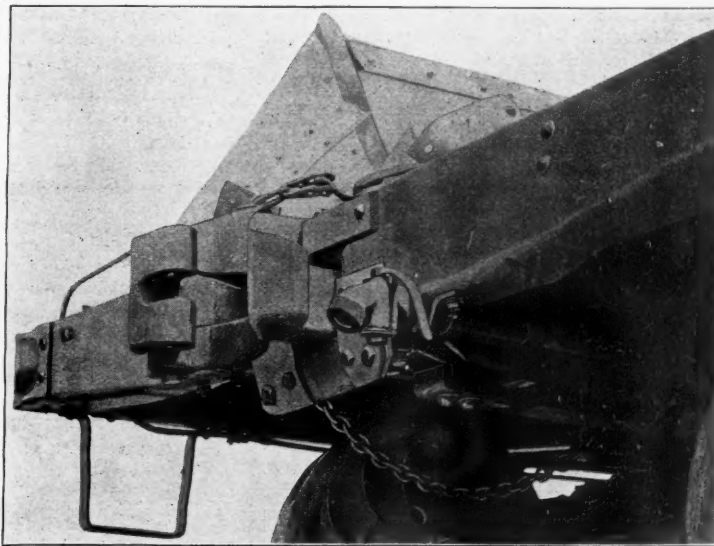


Fig. 10.—View Showing the Condition of the Westinghouse Friction Buffer After Severe Collision, Bottom Plate Removed.

had they been originally applied. Other things being equal, a railroad company could not profitably invest that amount in metal draft beams for 1,000 cars, as deductions must be made for the interest on the additional money tied up, or on \$1,300 for  $25\frac{1}{2}$  years, \$1,300 for 17 years, and \$1,300 for  $8\frac{1}{2}$  years. At 5 per cent. the interest would reach \$3,315, and deducting this from the cost of the wooden draft timbers, \$5,200, there remains only \$1,885, in addition to the value of the metal scrap, that could be profitably expended on metal draft beams for 1,000 cars; or, on the replacement basis, if the scrap is returned to the manufacturers in exchange, the railroad could only afford to pay \$1.88½ per car, additional, for new metal draft beams. The cost of labor in replacing wooden draft timbers is not taken into consideration, for if they last as long as the center sills, metal draft beams would be taken down as often, or whenever the center sills are replaced. If, as on gondola cars generally, the draft timbers are renewed three times during the life of the car, one set of metal draft beams would outlast 6 sets of oak draft timbers, and the economical value of the metal beams would then in the same manner be \$2.27½ per car above the value of the scrap.

It must not be forgotten, however, that metal draft beams, in addition to being a substitute for wood, generally also have draw-bar lugs or stops, sometimes also carrier irons or other parts of the draft rigging, as intrinsic parts of the draft beams, and to the economical value should therefore be added the cost of all such parts which are rendered unnecessary by the use of the metal beams.

With a faulty or inefficient draft rigging, wooden draft beams will, of course, appear to less advantage, because the metal draft beams are made an inherent part of the draft rigging, while with wood bolts and mortises are depended upon to secure the one to the other. In other words, the metal draft beams are part of, or compel the use of, draft riggings superior in strength and durability to those

in use with draft timbers, with a few exceptions only. In reviewing the various kinds of metal draft beams on the market, it will therefore be necessary to also refer to the draft rigging to which each kind bears relation.

It may be pertinent to call attention to the difference of opinion prevailing among railroad men as to the proper length of metal draft beams. Originally the draft timbers were only made long enough to take the draft rigging and were secured to the

timbers, make the draft rigging a self-contained car detail or unit. Of the first group the following are more or less known: The Gould, the Thornburgh, the Texas & New Orleans, the American and the Westinghouse. The second group is represented by the Western-Acme.

G.

#### Special Description.

In what follows we describe briefly the essential

beneath the center sills at either end of the car, being bolted to the framing; there are no projections of the beams into the center sills. Sub-sills or buffing timbers extend the full length between the rear ends of the draft beams, and where the buffing timbers have bearings, malleable iron caps are fitted on their ends, protecting the timbers and forming the rear abutments for the followers. Two long tie rods pass through and connect the lugs on the sides of the beams at the opposite ends of the car, making

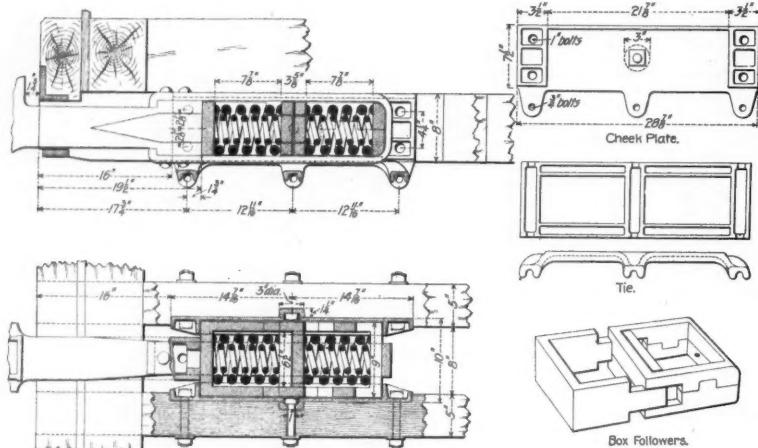


Fig. 2.—Thornburgh Draft Rigging for Wooden Sills.

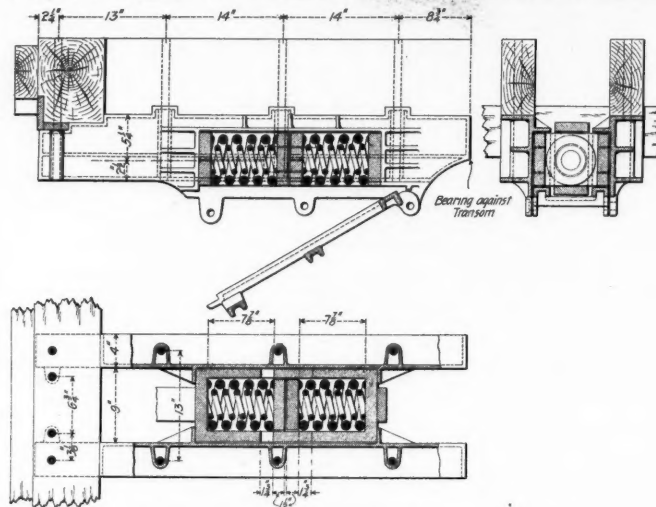


Fig. 3.—Thornburgh Draft Rigging and Malleable Iron Draft Beams.

center sills by bolts only. Key blocks were afterwards added to assist the bolts, and still later the draft timbers were extended to the wooden bolster. On some railroads the space between the bolsters is in addition blocked in, thus virtually forming sub-sills underneath the center sills, from end to end of the car. These steps have all been taken

features of each of these designs and show by the engravings the latest method of attaching the metal beams to the sills, and the details of the draft rigging. So far as possible it is stated how long these beams have been used, the approximate number in use and something about the service given. In one or two cases it has seemed advisable to illustrate and describe the draft rigging proper more fully than the title of this article in itself might warrant, but where this is done it will be found that the draft beams are really secondary to the rigging and cannot well be considered alone.

#### Gould Malleable Iron Draft Beams.

The malleable iron draft beams made by the Gould Coupler Co. are now used with the M. C. B. coupler yoke and follower plates on about 35,000 freight cars, some having been in use for four and five years, although the majority have been applied within the

practically a continuous rigging, and relieving the car framing of the more severe pulling forces; in the same way the buffing shocks are transmitted largely by the sub-sills. The draft beams have shoulders at the end sills and the carrier iron is provided with end lips for securing the beams transversely and resisting the side thrusts of the coupler on sharp curves. There is also an auxiliary carrier or tie, with lugs and shoulders, near the outer ends of the beams, which forms a brace and holds them securely to the car body at the ends. The forward follower lugs are cast on the beams and the followers are supported and held in place by straps which close the opening in the lower flanges, these straps being held by the vertical sill bolts. At the rear end of each pair of beams two bolts and thimbles maintain the proper spacing. To remove a coupler it is necessary to take down the carriers and the follower straps, all of which is accomplished by removing the nuts of 12 bolts.

#### Thornburgh Draft Rigging.

About two years ago (July 2, 1897) we illustrated a new form of draft rigging designed by Mr. William Thornburgh, and put on the market by the Thornburgh Coupler Attachment Co., Detroit, Mich. As stated at that time, the object of the design was to reduce the number of parts and make a stronger and more simple construction than was commonly used, at the same time providing means for replacing the coupler without taking down the entire draft rigging.

This arrangement consisted of two malleable iron castings, one being an oblong case with three sides which fitted between and bolted to the draft timbers, while the other casting was a spider which formed the bottom of the box and was joined to the upper part by three horizontal bolts. The coupler was held in place by the usual yoke, follower plates and springs, lugs or stops being cast on the inside of the case, which limited the movement of the springs to 1 1/2 in. and prevented their full closing. By removing two bolts, the spider could be swung down and the coupler, springs and followers taken out. This particular arrangement was only adapted for using a

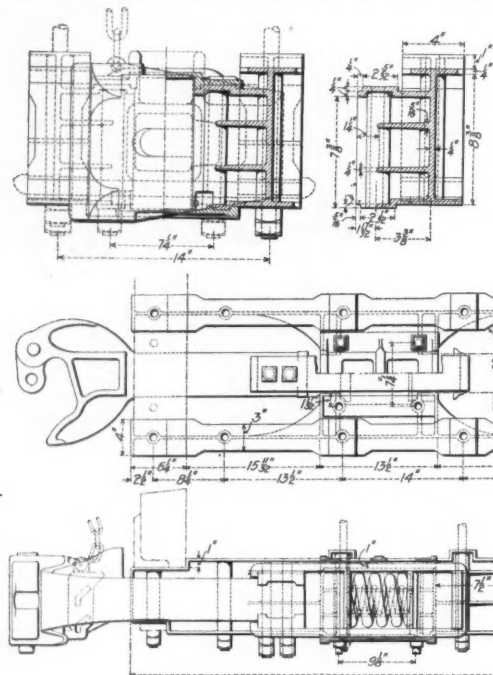


Fig. 4.—Malleable Iron Draft Beams of the Texas & New Orleans RR.

for the purpose of preventing the draft timbers from working, for it is well known that if they are allowed to do that they will soon split through the bolt holes, and the figures given above for the life of the draft timbers will not hold good. Metal draft beams would not themselves suffer injury if they were allowed to work, but they would be apt instead to cause damage to the center sills or to the draft rigging parts. For this reason they are made to bear against the bolster, either directly or through the intervention of wooden blocking. From a manufacturer's point of view the latter is preferable, as it enables a standard pattern to be used for all cars with the same spacing of sills, regardless of the type of bolster used or of the distance between the bolster and the end sill. The only advantage gained by extending the metal draft beams back to the bolster is that they furnish a stout support for the center sills, which otherwise are more liable to break off outside the bolster than at any other point. Still, with sound center sills of ample size, experience has shown that such re-enforcement is not necessary, and that short draft beams with wooden filling answer the purpose under ordinary conditions.

Coming now to the different designs of metal draft beams, or, more correctly, of iron or steel constructions taking the place of draft timbers, it will be found that there are two groups in the market; namely, the draft beams proper, which are made in pairs and carry the draft rigging between them; and casings, which, besides having the functions of draft

past two or three years. The makers state that they have never heard of one of these beams breaking, and Mr. A. M. Waitt, who used a large number of these while with the Lake Shore & Michigan South-

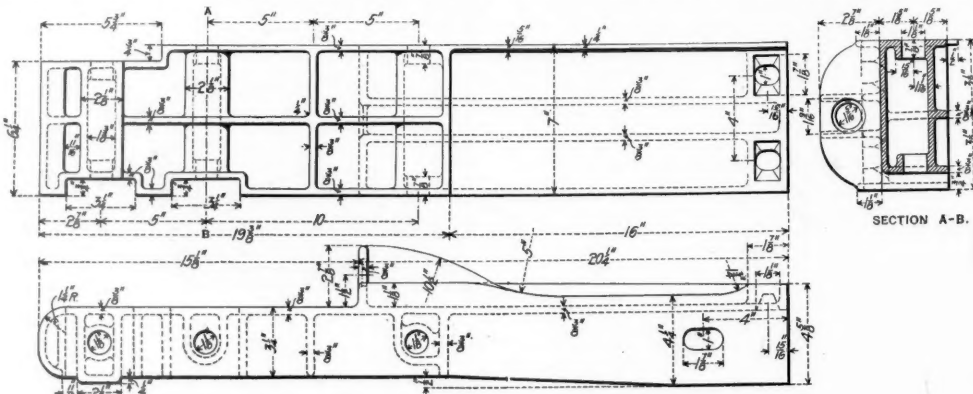


Fig. 1.—The Gould Malleable Iron Draft Beam.

ern, informs us that, "after many inquiries I have been unable to learn of a single draft arm being broken."

The design of this beam is shown by Fig. 1, the length being less than the distance from the end of the car to the transom. A pair of these is put

single nest of springs, and about 10,000 of these are said to be in use, and no breakages have been reported up to the present time.

There are now shown two recent designs by Mr. Thornburgh to meet the demand for greater spring capacity where large cars are used. Fig. 2 shows



the tandem spring arrangement for wooden draft sills, and Fig. 3, the metal draft beams and spring rigging as applied to 80,000-lb. coal cars. Like the first design these conform to the requirements of the recommended practice of the M. C. B. Association.

As shown in Fig. 2, instead of plates, the followers are in the form of boxes made of three malleable iron castings so fitted together as to allow the two springs to act as one in resisting either pulling or

ments are repeated as of interest in connection with the engraving showing the design of draft beams used by the Texas & New Orleans.

The drawings, Fig. 4, show the arrangement quite clearly so that little description is necessary. Each beam is a malleable iron casting having shoulders which engage the end sill and the body bolster, and three lugs which project into the center sills and take the place of the usual keys. It will be seen

follower straps the coupler can be removed, which is done by removing six nuts.

#### The Westinghouse Friction Draft Gear.

In connection with the subject of better draft gear the Westinghouse friction buffer is of much importance. Most recent draft riggings have been designed with a view to increasing the strength of the rigging, reducing the number of parts and so arranging them that the coupler can be easily removed. While these things have been carefully considered in the Westinghouse buffer, the primary object is something not attempted in any other form of freight car draft rigging; that is, to reduce and modify shocks and prevent the violent recoil of the draft springs by the friction of metal surfaces. The construction and working of this friction buffer were fully described in our issue of June 10, 1898, so that the principal features only will be noted at this time.

The accompanying engravings, Figs. 6, 7 and 8, show the latest form of buffer for steel and wooden cars, which is used with follower plates and the usual coupler yoke. Referring to the drawings, the outer cylinder is made of malleable iron and is 17½ in. long. Inside this cylinder there are cast V-shaped grooves in which engage 16 frictional strips, 8½ in. long, of wrought iron, case hardened. The strips are arranged around a cylinder loosely made up of eight malleable iron segmental carriers. On the inside of each of these carriers is a beveled surface, and when the carriers are assembled these beveled surfaces form a hollow frustrum of an octagonal pyramid; in this space works the wedge block which is carried loose on a spindle, called the release pin, and is made of cast iron and faced with very hard brass to prevent corrosion. There are three springs; the preliminary spring is an involute with a capacity of 16,000 lbs., the release spring is a coil of 25,000 lbs. capacity, within which is the auxiliary release spring of 7,000 lbs. The parts are proportioned so that these springs cannot close fully. The sum of all the resistances of the springs and the friction strips is about 170,000 lbs. as shown on the hydraulic press, but considerably more under service conditions.

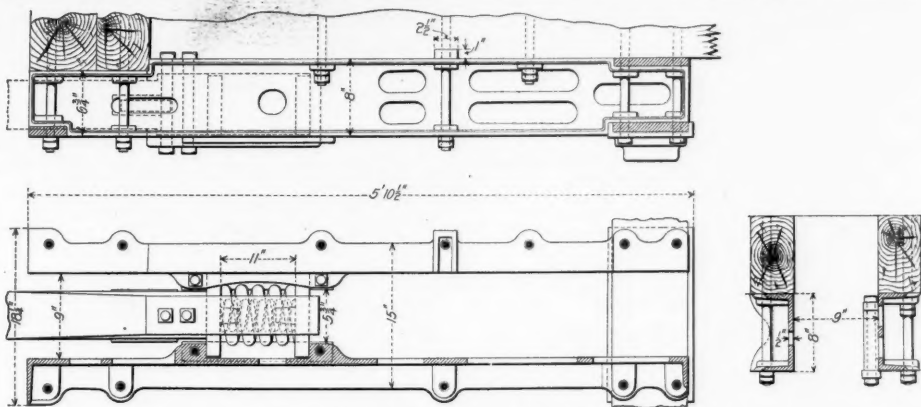


Fig. 5.—American Cast Steel Draft Beams.

buffing forces. Malleable cheek plates carrying stops are set into the draft sills and are bolted with five 1-in. bolts each. The proportions are such that the followers can move 1¾ in. and come together before the springs become solid, and before the coupler lug strikes the dead wood. A malleable spider or tie is used to hold the coupler and follower box in place, which is fastened to the cheek plates by three ¾-in. bolts; also by removing the two forward bolts the coupler can be removed.

When the malleable iron draft beams are used, as shown in Fig. 3, the stops are cast on the beams, while the follower box and tie are the same as those

that there is a considerable extension beyond the body bolster, and that the draft beams pass through the bolster. The spring arrangement consists of a single set of springs and malleable iron followers which engage stops cast on the draft beams. The two beams are connected by malleable iron plates at the top and bottom, which keep the coupler in place; by removing the lower plate and the carrying iron a coupler can be taken out. The sectional view gives the dimensions of the webs and flanges.

This design does away with about 50 parts of the usual draft gear, and service trials indicate that such sills have sufficient strength. One car was equipped for trial in 1893 and 15 others somewhat later, and as previously stated none of these has needed repairs to the draft gear.

#### The American Cast Steel Draft Beams.

The draft beam shown by Fig. 5 is somewhat similar to that used by the Texas & New Orleans, excepting that it is of cast steel. These cast steel beams were designed in 1894 by Mr. T. C. Salveter and are made by the American Steel Foundry Company, St. Louis, to suit the framing of different kinds of cars, and also to take various draft riggings. We are informed that several hundred beams have been in service a little over four years and the makers have not been called on to replace any of them; presumably none have broken.

The engraving shows the construction quite clearly, but attention may be called to a few points. The

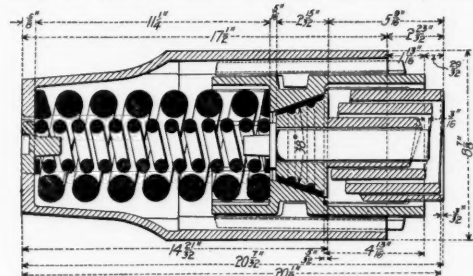


Fig. 6.—The Westinghouse Friction Buffer.

previously described. The metal draft beams are bolted to the center sills and at the front end there are shoulders which engage the end sill. Beside these there are three lugs on each sill which enter the center sills, while the rear end has a bearing against the body bolster.

#### Malleable Iron Draft Beams of the Texas & New Orleans R. R.

In our issued of June 2 last, we gave a summary of the discussion, at the Texas Railway Club meeting, of the subject of metal draft beams by Mr. J. R.

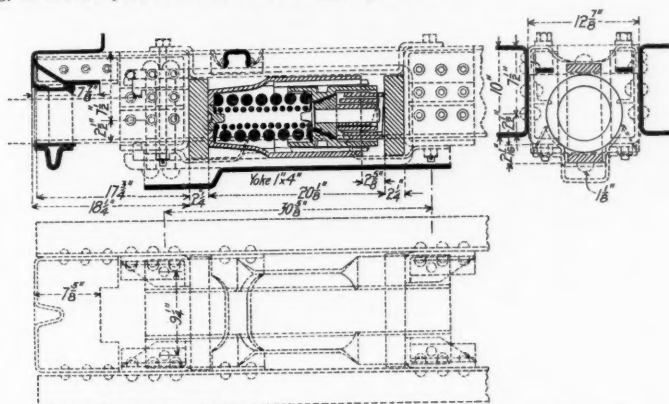


Fig. 7.—Application of the Westinghouse Friction Buffer to Steel Cars.

Cade, Master Car Builder, of the Texas & New Orleans, a part of the Southern Pacific System. Mr. Cade, it will be remembered, confined himself pretty closely to such facts as were shown by the records of that road, but stated that reports from other roads confirmed his general figures for the life of wooden draft timbers (from 3½ to 4 years), and also the satisfactory results obtained from the use of metal beams. It was expected that metal draft beams suitably designed should last twice as long as the car. One large road which has had several thousand metal draft beams in use for from two to three years is said to have had no breakages, and Mr. Cade states that some metal beams applied by him for trial six years ago have required no repairs. These state-

beams are in the form of channels extending the full distance between the end of the car and the body bolster. There is a shoulder at the end sill while the rear end of each beam is shouldered at the body bolster and fills the space between the upper and lower bolster plates, the vertical sill bolts passing through all these parts. When cast steel body bolsters are used the draft beams bear against, and are bolted to the bolster. Each beam has one projection, 2½ in. wide and 1 in. high, cast on the upper flange, which enters the center sill. In the arrangement shown, lugs are cast on the inner faces of the beams which form stops for the follower plates and the usual arrangement of M. C. B. coupler yoke and followers is used. By taking down the carrier and

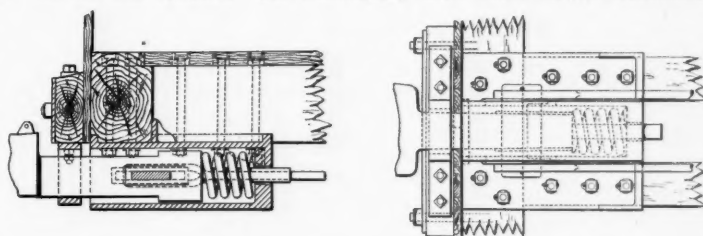


Fig. 11.—Western-Acme Cast Steel Pocket as Applied to Cars Having American Continuous Draft Rigging.

In buffing, the thrust is taken first on the head of the cylinder and is carried back through the release spring, carrier segments, the wedge block and the preliminary spring to the follower. The spring reaction on the wedge block spreads the carrier segments, and these in turn force the 16 friction strips into the grooves in the outer cylinder, and so the backward movement of the cylinder is retarded by the friction of these surfaces. What is also quite important is that after the springs are compressed the rear end of the release pin is brought in contact with the fol-

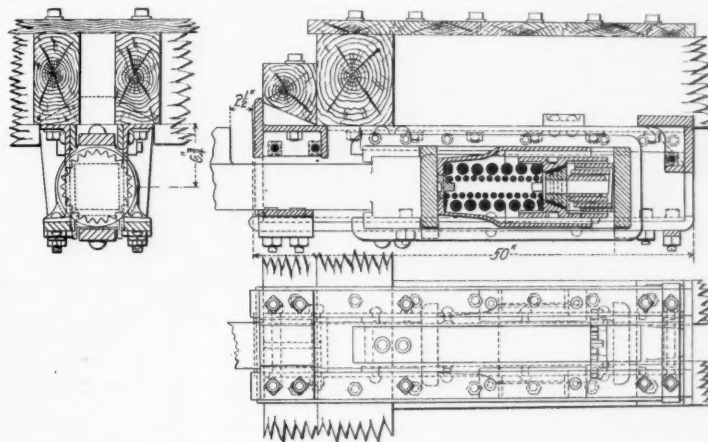


Fig. 8.—Application of the Westinghouse Friction Buffer to Wooden Cars.

lower, so that further compression results in the collar of the release pin being moved out; there is then no action of the auxiliary release spring on the wedge which would tend to release or impair the frictional engagement between the wedge and the carrier segments. These segments bottom on the follower before the springs are entirely closed down, and then the friction of the strips in the grooves of the cylinder is the principal resistance to further movement of the parts.

When the buffing force is removed, the first thing to happen is that the auxiliary release spring acts on the wedge block, forcing it back and relieving the segments from the wedge action. The main release spring acting on the segments then begins to disen-

gage them, but this is not all done at once. The grooves in the segments, in which the lugs on the friction strips engage, are of four different lengths, varying by  $\frac{1}{8}$  in.; that is, there are four grooves of each particular length. Because of this the friction strips are picked off in groups of four, a group for each successive  $\frac{1}{8}$  in. of travel. The release spring therefore has to act against the friction of only four of these strips at a time, making more certain their disengagement. The arrangement for releasing is one of the fine points of the mechanism.

It will be seen that the action of this device is essentially the same under pulling forces as has been described for buffing. And so far as the friction buffer itself is concerned the construction is the same for both wooden and steel cars, but the method of attaching the buffers to the underframe differs.

With the steel cars the draft gear is placed between the center sills, and the follower plates engage pressed steel lugs riveted to the sills. There is also a top plate of pressed steel that forms a guide, and a bottom plate that supports the rear of the coupler and the attachments; these plates are kept in place by vertical bolts that pass through the lugs, and by removing the lower plate and the carrier at the end sill the coupler can be removed.

In the arrangements of the friction buffer for wooden cars, malleable iron castings take the place of the usual wood draft sills. These metal beams are made in the form of channels and are bolted to the center sills, while projections on the castings that enter the sills correspond to the usual keys. These draft beams are continuous only on the upper sides, each being formed with an open-bottomed recess for the greater portion of its depth to admit the friction buffer and followers. The two beams are bolted together at both ends, the bolts passing through malleable iron distance pieces; at the front the distance piece is recessed into the end sill and forms a striking plate for the coupler. The followers engage lugs cast on the draft beams. There are guide strips riveted to the upper portions of the draft beams, and when in position the outer cylinder of the friction draft gear is supported on castings riveted to longitudinal bars which extend across and close the recesses in the beams. The bars are bolted to the flanges of the draft beams and the coupler is removed by taking down these longitudinal bars and the carrier.

There are now nearly 3,000 cars fitted with the Westinghouse draft rigging and all of these with the exception of 45, belonging to the Frick Coke Company, are steel cars. The largest number on any one road is on the Pittsburgh, Bessemer & Lake Erie, where 2,000, 100,000-lb. capacity steel cars have been equipped with this device for about two years and have given excellent results. The other roads having cars fitted with this draft rigging are the Pennsylvania Railroad, Pennsylvania Lines West of Pittsburgh, Union Railroad, Pittsburgh & Lake Erie, Butte, Anaconda & Pacific, and the Frick Coke Company's cars. In addition to these, a number of experimental sets are now being put on the tenders of heavy locomotives. This would seem to be a particularly good place for the friction buffer, as the ordinary draft springs are closed long before the full tractive power of the locomotive is reached, resulting in severe shocks to the draft rigging and underframing of the cars. With the friction buffer on the tender, the yielding resistance in the draft rigging is known to be increased about eight-fold, making it greatly exceed the full capacity of the heaviest locomotive. Also, beside the cars in this country fitted with friction buffers, there are now a number of experimental sets abroad and these are said to be creating much interest among railroad men in England and on the Continent.

The half-tone engravings, Figs. 8 and 10, are interesting as showing the result of a serious wreck of some steel cars fitted with the Westinghouse buffer. It will be noted that the coupler and the entire draft rigging is uninjured, while the ends of the car are badly damaged by telescoping. This accident would seem to support the claim made for the buffer, that the yielding character of the resistance and the great capacity of the buffer is an important help in avoiding damage to the draft gear and couplers from unusual shocks, both in ordinary service and in serious collisions.

#### The Western-Acme Freight Car Pocket.

This device, shown by Fig. 11, consists of a single steel casting which takes the place of the usual draft timbers, being adapted to cars having the American continuous draft rigging. It is made by the Western Railway Equipment Co., St. Louis, Mo. This casting has projections on the upper side which enter the center sills, while it is held in place by ten vertical bolts through the car underframe. The draft bar extends through openings in the sides of the coupler pocket and by removing this bar and the carrier the coupler can be taken out. It will be seen that but one set of coil springs is used. A modification of this pocket is used for locomotive tenders where the draft rods are short and each pulls against a double-coil spring placed just outside the pocket at the back. This arrangement gives two double-coil springs for pulling and one double-coil spring,

within the pocket, to resist buffing shocks. We believe these cast steel pockets for cars have been used for two or three years, principally on roads in the Southwest. Mr. R. M. Galbraith, General Master Mechanic of the St. Louis Southwestern, has about 100 locomotive tenders equipped with this arrangement and proposes to apply it to other locomotives. He states that he finds it well suited to the

#### The Standard Coupler Co.'s Draft Beam.

Since we began the preparation of this article we have seen a design, carefully worked out by Mr. Sessions of the Standard Coupler Co. He uses rolled steel sections, and has produced a powerful combination, which in the drawing is very promising, as one would expect from a designer so experienced.

#### Sargent's Automatic Semaphore.

The Sargent Automatic Railway Signal Co. of Rochester, N. Y., has in use on the Buffalo, Rochester & Pittsburgh and on the Baltimore & Ohio a sema-

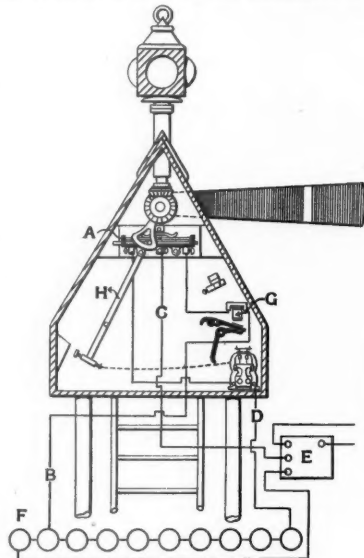


Fig. 1.—Sargent Automatic Semaphore.

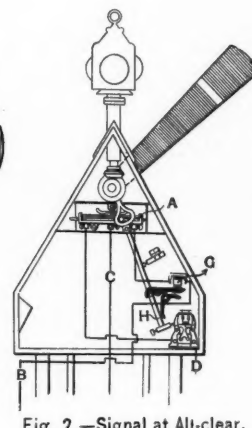
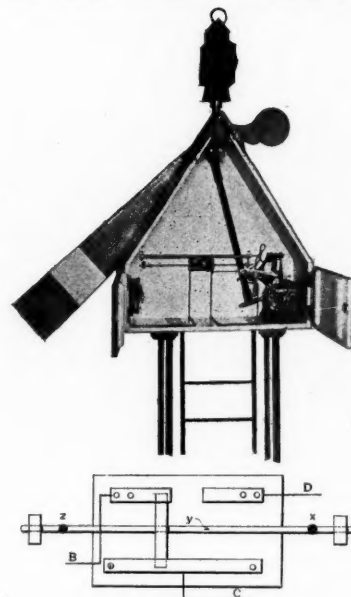


Fig. 2.—Signal at All-clear.



Figs. 4 and 4, a.—Sargent Signal.

phore signal worked by an electric motor, in which the motor is placed in a box at the top of the post and the night indication is given by a lamp fixed to the top of a vertical spindle, revolving on its axis, which is geared to the spindle that carries the semaphore arm.

The appearance of the signal is shown in the illustration, Fig. 3, and Figs. 1 and 2 show the mechanism by which the motor works the signal. The relay, e, controlled by the rail circuit normally holds the power wire, C, (Fig. 1) open. The magnet circuit, B, is so connected to the battery, F, as to use only two cells of it. The entrance of a train to the section of track protected by the signal opens the relay, and the battery is cut off both from the motor and the magnet, G. The armature of the magnet, falling from the position shown in Fig. 2, releases the arm

tact with the lower arm of the elbow-lever, which in turn forces the armature on the latch against the magnet just as the roller passes under the latch hook, and also just at the moment when the motor circuit is cut off and the magnet circuit established by the operation of the switch-board, A. The magnet circuit remains active as long as the block is clear, thus holding the semaphore in the safety position. In the use of this lock it is necessary to use only sufficient current to sustain the weight of the latch, two cells of the battery being quite enough. The energy consumed is only 0.04 watt, and the two cells will hold the signal in the safety position continuously for more than nine months without renewal.

Fig. 4 shows the Sargent apparatus as designed to work a counterweighted semaphore. The "switch-board," A, Fig. 1, is fixed lower in the box.

The connections of switchboard, A, are shown in Fig. 4, a. The main lever, H (Fig. 1), in its movements strikes the pins, z and x, Fig. 4, a, and pushes the slide, y, so as to connect wire, C, alternately with B and D.

When a train enters a block the track current is immediately short-circuited and the magnet circuit broken at the relay, thus releasing the operating arm from the hook and permitting the semaphore to return to its normal or horizontal position by gravity, the shock of the movements in either direction being taken up by spring buffers.

The Sargent Company furnishes a similar signal for highway crossings. A signal with arms extending out in both directions is fixed to an overhead signboard placed across the highway, showing "danger" plainly to pedestrians or drivers approaching the railroad. A loud gong rings while the signal is in the danger position. This gong is so adjusted that the voltage may undergo a change of 70 per cent. without affecting the operation of the gong or the loudness of the tone.

#### Handling Ballast on the Michigan Central.

Probably a good many have found that the usual method for loading gravel ballast on flat cars, either by a steam shovel or with laborers, and distributing it by a work train, may be well adapted for the main lines of railroads, but that the method does not apply so well to branch line work. There, before a sufficient appropriation can be obtained for putting on the large extra force needed, the track is usually in poor condition. The problem is rather how to get the ballast loaded and distributed in small lots without interfering with other departments and the movements of trains, without keeping cars intended for other purposes out of service, and with but a small addition to the regular force; briefly, to get the work done cheaply and without attracting a great deal of attention. A plan for doing this has been worked out during the past summer on the Saginaw Division of the Michigan Cen-



Fig. 3.—Sargent Semaphore Signal.

controlling the signal and it swings to the position shown at H, Fig. 1, the force of gravity at the same time bringing the semaphore arm to the horizontal position, indicating "danger."

When the train clears the block the closing of the relay, E, completes the motor circuit through wires C and D, and the main operating arm, H, is drawn to the right, moving the signal arm upward to the all-clear position. This position is adopted so as to avoid the objectionable counterweight. With this arrangement any accumulation of snow or ice on the semaphore arm will, of course, increase the power tending to move the arm to the "stop" position. In this connection the makers point out that



tral under the direction of Mr. A. Torrey, the Chief Engineer. We are indebted to Mr. Torrey for the opportunity of seeing how gravel is loaded and distributed on that part of the road.

The essential features of this plan include a portable conveyor at the gravel pit, driven by a gasoline engine, so that the men at the pit have only to feed the hoppers and are not required to throw the gravel

The pit from which the gravel is taken is near Bennington and about midway of the division. A large area has been stripped having a face about 600 ft. long and 15 ft. high, and the general arrangement of the tracks and apparatus used for loading is illustrated by the sketch, Fig. 1; there being two tracks, 12 ft. center to center, along the face of the bank in addition to the storage track not shown.

the full length of the pit before the tracks are shifted. The small section of gravel below the level of the hoppers, shown by dotted lines in the sketch, is not within reach of the shovels when they are attached to the ropes, and has to be removed by shoveling in the usual manner.

The conveyors are driven by a 2½ h. p. Fairbanks-Morse vertical gasoline engine, and a friction clutch

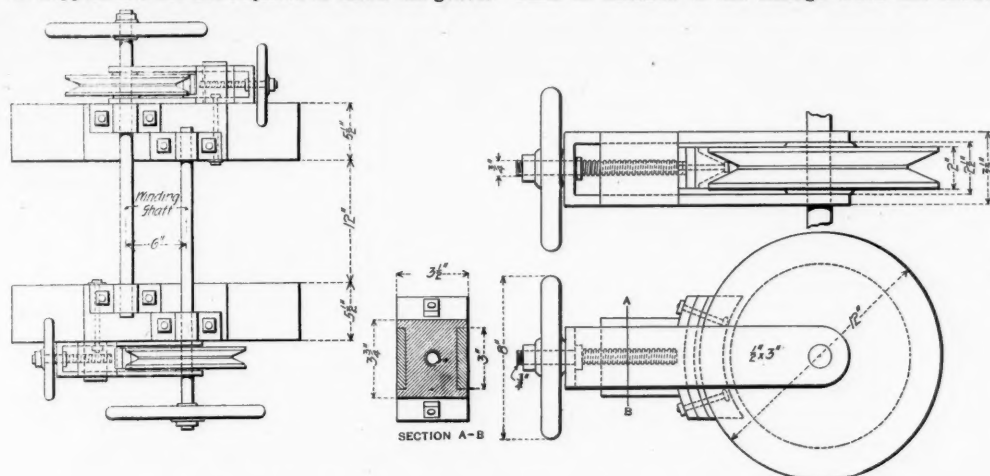


Fig. 3.—Details of Locking Device—Michigan Central Ballast Car.

into the cars. The side dump cars used are not intended for regular service, but are designed especially for carrying gravel, cinders or such materials, and so that the crews of local freight trains can attend to the distribution without seriously adding to their duties or delaying trains. Then the cars are so made that only the required amount of gravel is dumped in one place, and as this falls at about the ends of the ties, it can be put in the track whenever the regular force can conveniently do so.

The Saginaw Division, portions of which are now being ballasted in this way, extends from Jackson to

These tracks have such an incline that the ballast care can be started by releasing the brakes, so that a car is dropped down opposite the conveyor as required, loaded, and run along to make room for the next. It was the intention, in loading, to push the conveyor along without moving the cars, as the conveyor can easily be moved by four men, but the method first mentioned is found to be preferable under the circumstances.

The loading machine consists of a four-wheel platform car, housed over, to the sides of which is attached a frame supporting the two conveyors. Each

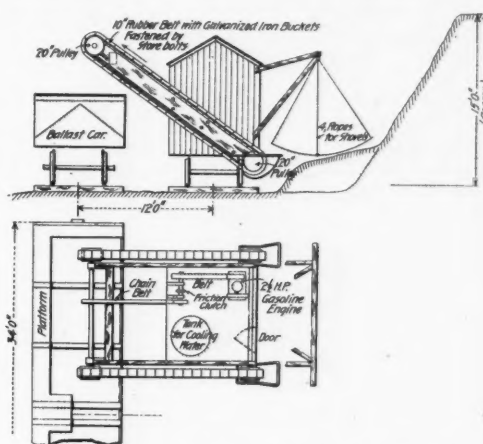


Fig. 1.—Machine for Loading Ballast—Michigan Central Railroad—Plan and Elevation.

is placed in the counter shaft, so that the conveyors can be stopped while cars are being moved without shutting down the engine.

It will be seen from the plan that the ballast cars are divided near the middle, forming two compartments, and that in each compartment there are two cross-ties at the top dividing the car into six sections. The conveyors are so spaced that the first and third sections of the car are first loaded, and then incline troughs are set up which direct the gravel from both conveyors into the second section; the car is then moved so that the fourth and sixth sections come opposite the conveyors, and by the use of troughs, the fifth section is loaded. The foreman attends to shifting the cars, and trimming the load when necessary.

The first cost of the loading machine was about \$700, and a foreman and six men are required to work it to advantage. These men can load during a day nine cars with 30 cu. yds. of gravel each, but 25 cu. yds. is the usual loading and nearer the carrying capacity of the 60,000-lb. car trucks; each shoveler therefore does the work of about three men under the usual conditions. The engine uses from 2½ to 3 gallons of gasoline a day, costing 12½ cents a gallon. At this rate of working the gravel distributed along the tracks costs about 4½ cents a cubic yard, when no account is taken of the interest on the investment or the cost of throwing the tracks at the pit. The Michigan Central uses 18 special ballast cars for this service, nine being loaded each day, and as the gravel in one car is distributed along 75 ft. of track, with this equipment it is estimated that gravel for

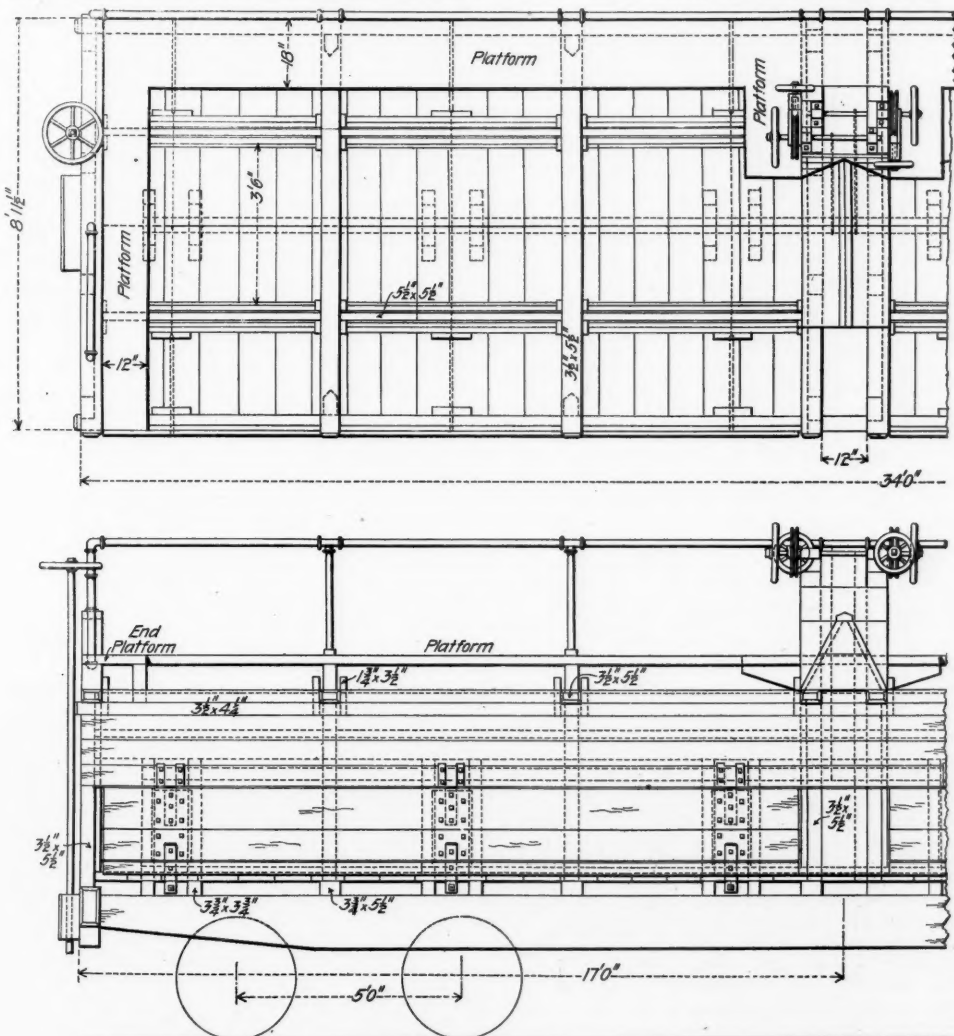
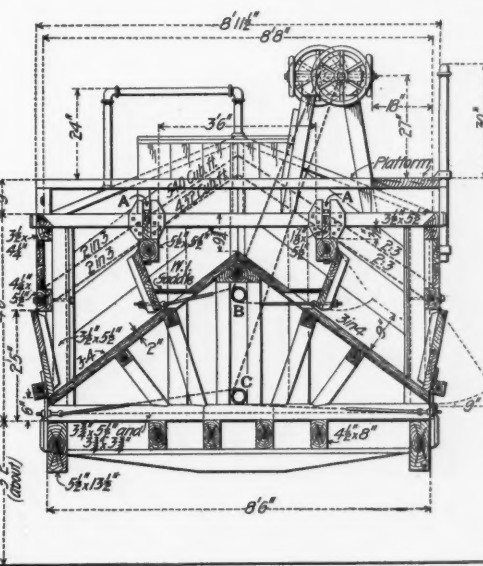


Fig. 2.—Michigan Central Double Deck Ballast Car.

Bay City, Mich., about 115 miles. Early last spring an inspection was made and short stakes were set defining the limits of those sections where gravel was most needed. When it is desired for the trainmen to unload at one of these places, high stakes are set up marking the limits, each stake having a cross-arm indicating in which direction from the stake the gravel is to be dumped. The trainmen are found to require no orders further than to unload near the first high stake met and set the ballast cars out at the next station, to be returned to the pit by the first local train. The high stakes are set by the section men as directed by the Roadmaster.

conveyor is made of a 10-in. rubber belt to which galvanized iron buckets are fastened by stove bolts, the buckets overlapping at the sides, so that there are no openings formed when the belt passes around the pulleys; these pulleys are 20 in. in diameter. Two men shovel into each hopper, and as the bank is somewhat hard two men work above with picks, so that the gravel comes down within easy reach of the shovelers. Large grain scoops with long handles are used by these men, and the work is made easy by suspending each shovel with a rope from an overhead frame; in this way the men are required to do very little lifting. A cut about 8 ft. wide is made



about three miles can be distributed during a month, if there are no important delays; or about 18 miles a year. During the winter months it is proposed to use the ballast cars at different points for hauling cinders, sending them out on local freight trains, and air hoists will probably be used for loading the cinders at most points, but the loading machine may be placed at the principal cinder pit.

As previously stated, the cars were designed so that the unloading could be easily done by the trainmen and so that only the required amount of material would be left alongside of the track at one place; also, so that the cars could be used either for

gravel or cinders. The principal features of these cars are shown by the drawings, Fig. 2. It will be seen that the underframe consists of center and side sills and one pair of intermediate sills; truss rods being used, although not shown on the drawings. Upon these sills is placed a strong construction of posts and bracing supporting the floor, which is given a slope of 3 to 4 sufficient to discharge cinders. The car is divided near the middle so as to form two compartments between which is an open space 12 in. wide for the chains operating the doors; the doors extend the full length of the compartments, there being two sets of doors for each compartment. The outer doors are hinged from  $4\frac{1}{4} \times 5\frac{1}{2}$  in., and the inner doors from  $5\frac{1}{2} \times 5\frac{1}{2}$  in. longitudinal timbers, and the sides of each compartment are tied together at the top in two places by  $3\frac{1}{2} \times 5\frac{1}{2}$  in. timbers. The inner doors are so placed that about the same amount of material is carried on either side. Load lines for 16 and 20 cu. yds. of gravel are shown, and when it is desired to carry still larger loads, a set of planks are placed in the pockets marked "A," and the load line is then determined by the height of those boards; when not in use the extra boards are carried under the floor, this space being reached through doors in the ends of the car.

All the inside doors are worked at the same time from the longitudinal shaft "B," and all the outside doors from the shaft "C." The door connections, for such lengths as are exposed when the doors are open, are made with iron rods, to which the chains are attached. The device mounted at the middle of the car for operating the doors, is best shown by the detail drawings, Fig. 3. It will be seen that this consists of separate winding shafts for the inner and outer doors, and that the locking apparatus also is separate for each. The novel feature is the use of a cast iron block which engages a V-shape groove in a wheel mounted on the winding shaft, the frictional contact being depended on to prevent the release of the doors when the car is loaded. This block can be put under a heavy pressure by the screw and hand wheel, and has been found to make a very satisfactory locking arrangement.

In dumping a number of cars, the brakeman goes from one to another releasing the outer doors by giving the small hand wheel a few turns, a brake stick being used to start the wheel. When all the outer pockets are dumped, the train is moved ahead and he returns and releases the inner doors, each hand wheel being marked so as to indicate plainly which is to be used first. The cars are returned to the pit with the doors unlocked, and as there are usually two men to do the dumping, the delay to the local freight train is unimportant. To facilitate passing over the cars, a platform 18 in. wide is placed along one side, and 12-in. platforms are built at the ends, hand rails also being provided. Eighteen of the ballast cars were built at the company's shops at Detroit.

#### The Westinghouse Electro-Pneumatic System of Motor Control and the Baldwin New Trucks for Heavy Electric Cars.

A new system of controlling any number of electric motors from one point has been invented by Mr. George Westinghouse, and a two-car train equipped with the controlling apparatus and with new trucks made by the Baldwin Locomotive Works is now running experimentally between Wilmerding and East Pittsburgh. As applied to railroad trains, the invention of Mr. Westinghouse is for the purpose of simultaneously controlling from either end of a train the motors on all of the cars. The method of control is not limited, however, to trains, but is applicable for such work as moving cranes, lifts and for controlling the apparatus used in charging coke ovens and furnaces. It can be applied to any class of machinery where it is necessary for the operator to be stationed at a considerable distance from the motors. It is our purpose to confine the explanation of the invention, however, to cars for heavy electrical service, with particular reference to elevated railroad work.

This system is adapted for use on any number of motor cars making up a train. Each motor car requires the usual current collecting and controlling devices and a full set of air compressing and storage apparatus is used on at least one car and auxiliary storage apparatus is placed in each motor car. The controller proper may be of any standard type designed for railroad work, but instead of the usual hand lever a device worked by air power is employed, and this device may be used in connection with any form or design of controller.

The devices for operating the controller and circuit breaker do the work which the motorman otherwise does when the ordinary method of hand control is used. The controller may be placed at any notch and the movement over a complete cycle may be made either slowly or quickly, as the condition may require. The air is taken from the same reservoir which supplies the brakes, and the electric current for operating the magnets is obtained from a small primary or secondary battery. The movements of the controlling apparatus are therefore independent of the power circuit, except in so far as the reservoir is periodically charged by the motor-driven

pump, which receives current from the power circuit.

Upon the extended end of the shaft of the main operating drum of the controller, in place of the handle, are mounted two ratchet wheels and a pinion, as shown in Fig. 2. Upon the top of the controller frame are mounted two horizontal air cylinders. The shorter of these two cylinders contains the piston for working the pawls, which engage the ratchet wheels. The piston rod of the longer cylinder is provided with a rack which meshes with the pinion. Both of these cylinders are single-acting, and are mounted so as to produce opposite direction of rotation of the controlling drum. To the upper part of the cylinders are attached the iron-clad magnets for working the air valves. The coil of the magnet which operates the air valve is imbedded between an iron core and an iron shell, and the armature, which consists of a circular iron disc, partially completes the magnetic circuit between the upper ends of the core and the shell. An air gap is maintained by means of a spring-washer bearing against the armature. When the circuit is closed the armature is attracted, compressing the spring-washer and opening the air valve below the magnet by means of a brass rod attached to the armature. The valve is provided with a spring for keeping it normally in the closed position. These magnets require but one-twentieth of an ampere at 6 to 8 volts. A battery of 10 or 12 cells is sufficient for a train of five cars, and will last a long time. Each motor-car is provided with one of these batteries.

The controller and circuit-breaker may be mounted anywhere on the motor-car, but should be placed in an accessible place on account of inspection and repairs. For this reason it is always preferable to place the controller in the motorman's compartment or in a special compartment provided for the purpose.

To operate the controlling apparatus of each motor-car of a train, from any specified place on the train (say either end of any motor-car), a multiple control switch is required. With this switch the motorman makes or breaks the electric circuit from the battery through the several air valve magnets on all the cars of the train.

A single stroke of the ratchet piston turns the controller "on" one point, hence this piston must make as many strokes in turning the controller "full on" as there are operating points or notches. Two pawls and ratchet wheels are used only in cases where movement-steps of different lengths are desired, and in such cases ratchet wheels of different diameters are used. To prevent the inertia of the controller-drum from carrying it further than is intended with any given impulse, the ratchet wheel is provided on the under side with a series of projections. A stop attached to the frame successively engages the several projections by the air pressure in the cylinder which works the pawls. Hence, whenever air is admitted to the operating cylinder the stop is brought into position by the time the pawls have completed their stroke, and the controller drum is thus prevented from turning too far.

When air is admitted to the long cylinder, the piston is forced to the end of its stroke. This throws the controller to its "off" position. The action of this cylinder is independent of the position of the controller at the time the air is admitted, the piston making either a full stroke, or a part of a stroke, depending upon the position of the controller.

The shaft of the reverse switch is also extended above the controller top and carries a pinion. The rack which engages the pinion is formed on a piston rod having at each end a small piston which works in a corresponding cylinder. On one of these cylinders are mounted two magnets and the necessary valves for controlling the admission of air through suitable ports to either of the two cylinders. Air admitted into one cylinder will set the reverse switch in the position for giving a forward movement to the car, and when admitted into the other cylinder will set the reverse switch for a backward movement of the car.

The circuit breaker is provided with two cylinders with pistons and rods arranged to act on a lever for closing and opening the circuit breaker. These cylinders are of different sizes, the larger of which is for closing the circuit breaker and receives air from the reversing switch cylinder on the controller (see Fig. 2). The smaller of the two cylinders is for opening the circuit, and the air for this cylinder is supplied by means of a magnet and therefore similar to those used on a controller.

The multiple control switch shown in Fig. 3 is enclosed in a metal box and has three handles, as shown in the engraving. This box contains the several switches which are in circuit with the controlling magnets. The handle marked on the engraving "operating handle" is designed to close the main battery circuit leading to all the switches contained in the box when the handle is in place as in the illustration, and to open this circuit when the handle is removed, so that it is impossible to work any part of the controller when this handle is removed from the box. A movement of this handle to the right closes the circuit to the magnet of the operating cylinder, which in turn admits air, the result being that the controller is turned on one notch. The position of the controller is indicated by the position of the index on the face of the box. It

is therefore necessary to move this handle to the right and back to the middle position as many times as there are notches of operating points on the controller in order to move the controller to the full speed running position. When turned to the left the controller is released and the circuit to the magnet of the release cylinder is closed. The magnet circuit is not opened by bringing the handle back to the middle position, but when the controller is fully released air from the release cylinder is delivered to a small cylinder and piston in the multiple control switch, by means of which the magnet circuit is opened and the index on the face of the box turned to the "off" position.

The upper handle works the reverse switch of the controller. To make the car go forward this handle is turned to the right slightly beyond the position shown. This closes the battery circuit through the magnet which works the valve, supplying air to one of the reversing cylinders on the controller. When the handle is turned to the left the car moves backward and similarly admits air to the other reversing cylinder on the controller. The handle will remain in either position, thereby indicating the direction in which the car will move.

The handle on the engraving marked "cut-out switch" at the right side of the box is used to cut out of service part of the controllers on the train. When in the extreme upward position the motor car on which the box is mounted is in service, while the others are out of service. When the handle is thrown downward to the extreme position the motor car upon which the box is mounted is out of service and the other motor cars are doing the work, and when the handle is in the middle position all the motor cars of the train are in service. All parts of the multiple control switch proper are made interchangeable so that any switch can be mounted on any back, the electric and air connections being permanently made to the base and the connections with the switch made through the plugs and sockets. It will thus be seen that the switches on the controlling box are the most important part of the invention. An emergency device is also provided in connection with this system. This consists in the main of an air-connection between the automatic air brake cylinder and the release cylinder on the controller. Whenever the air brake is applied the controller will be released by the air pressure from the brake cylinder, if by any means this has not been done by the operator. It is therefore not necessary to first release the controller before applying the brakes, but a single movement of the brake valve opens the motor circuit by making the controller drum return to the "off" position, and at the same time applies the brakes.

In the cars now running at Pittsburgh the electro-pneumatic control also works the pneumatic sanding device, the supply of air being controlled by means of magnets similar to those on the motor controlling apparatus. An additional circuit through the train is necessary for such service.

A pretty accurate notion of the complete device is shown in the engraving, Fig. 1. The multiple control switch is shown in the upper right hand corner from which run the wires that make connection with the controlling apparatus, the details of the air mechanism of which are shown in Fig. 2. In Fig. 1 are shown the connections directly with one motor truck. When applied to elevated railroad trains the best results are sometimes obtained by equipping only the front and rear cars of each train, and considerable expense is saved by judiciously placing the complete apparatus only on such cars as the specific conditions may demand.

The compressors used on these cars were designed by Mr. Westinghouse and are worthy of special mention. Heretofore the motor-driven air pumps have been of the reciprocating type. The new pump used in connection with the Westinghouse controlling apparatus is of the compound rotary type. A balancing ring has been used in this pump for the purpose of reducing the friction between the moving piston slides and the inner surface of the cylinder. A new device has been perfected also for injecting oil at different points and pressures for lubrication.

A fully equipped elevated railroad train, designed as a model for such service is running on the experimental tracks (covering a distance of two miles) between the works of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, and the Westinghouse Air Brake Company at Wilmerding. This train is worked by two motor cars designed with special reference to the requirements of electric traction on elevated railroads. Each motor car is equipped with two 150 h. p. Westinghouse motors mounted on a truck of special design made by the Baldwin Locomotive Works. The motor truck is placed under the front end of the motor car. The frame of the car body is made of steel beams with a steel floor plate at the motor end. It is built so as to give a maximum amount of space between the motors and the floor of the car, maintaining at the same time the usual height of platform of standard elevated railway cars. These cars were built by the Wason Manufacturing Co., of Springfield, Mass.

The motorman's compartment occupies the entire end of the motor car and is separated from the pas-



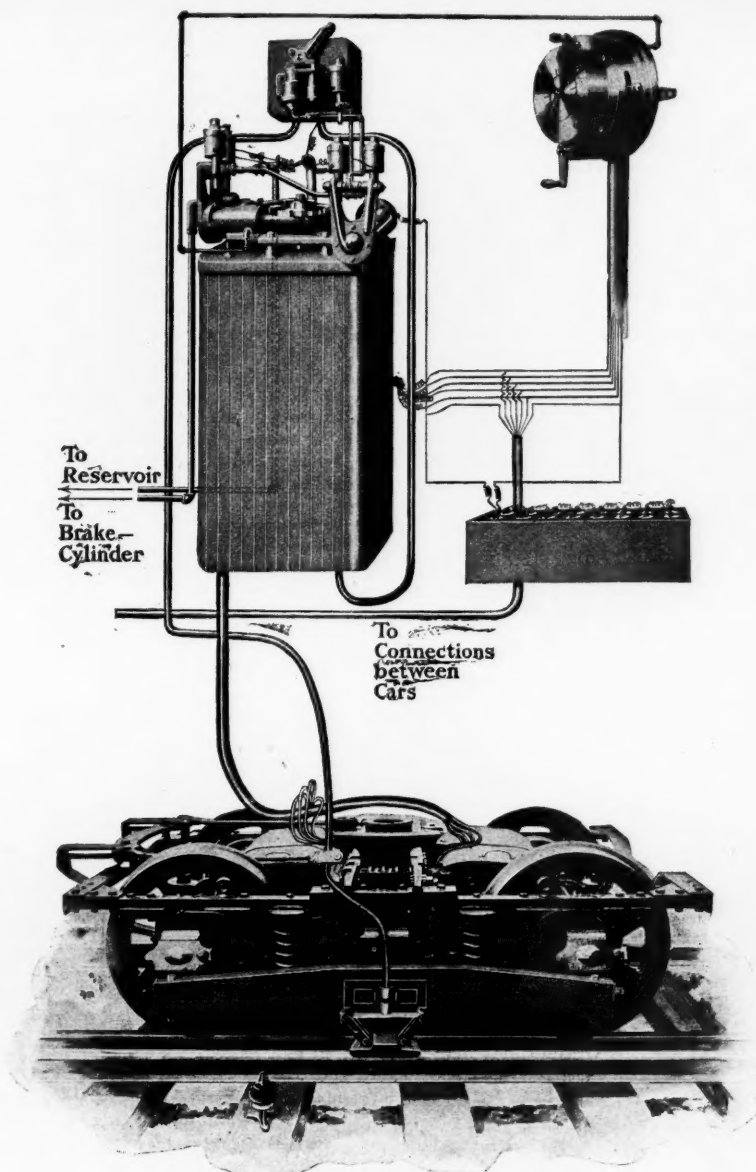


Fig. 1.—The Westinghouse Electro-Pneumatic System of Motor Control.

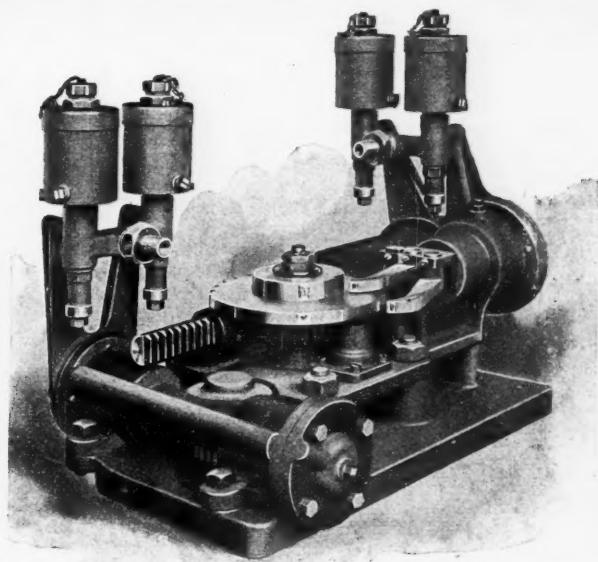


Fig. 2.—Air Apparatus on Top of Controller.

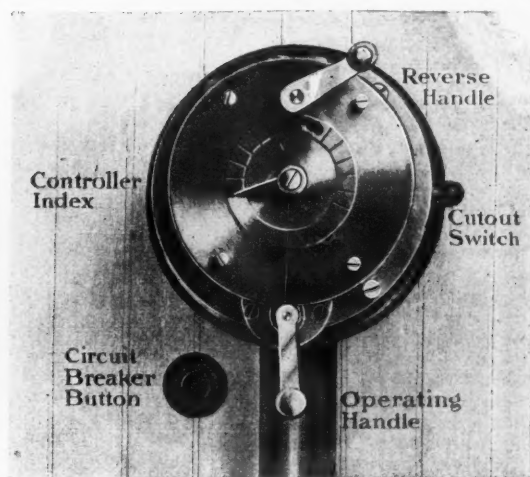


Fig. 3.—Multiple Control Switch.

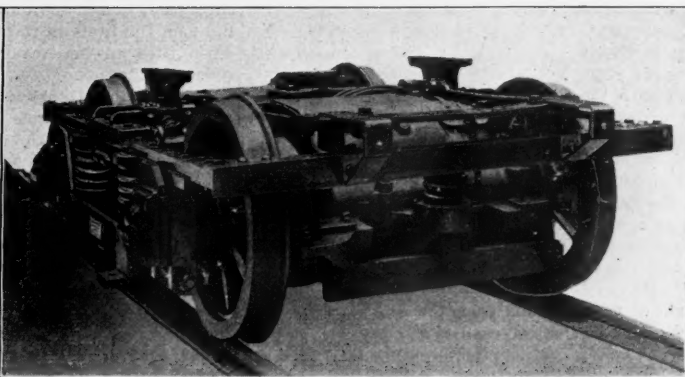
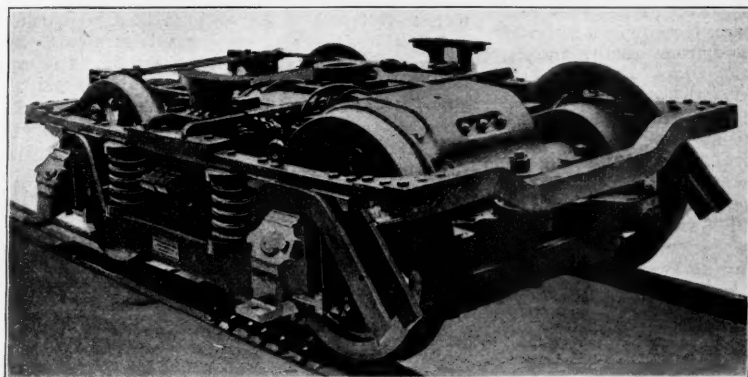
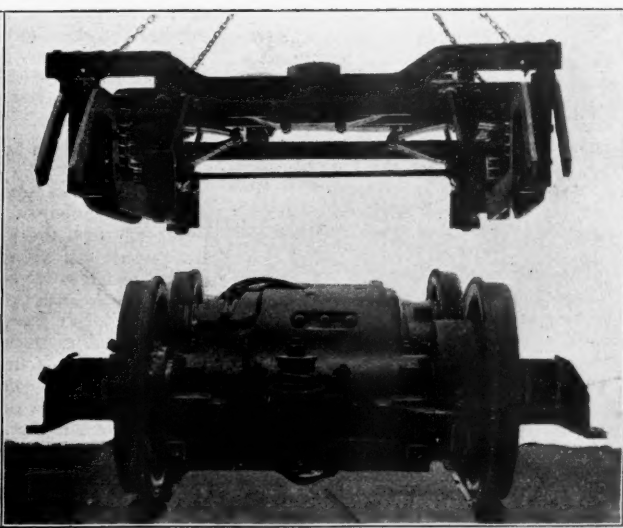
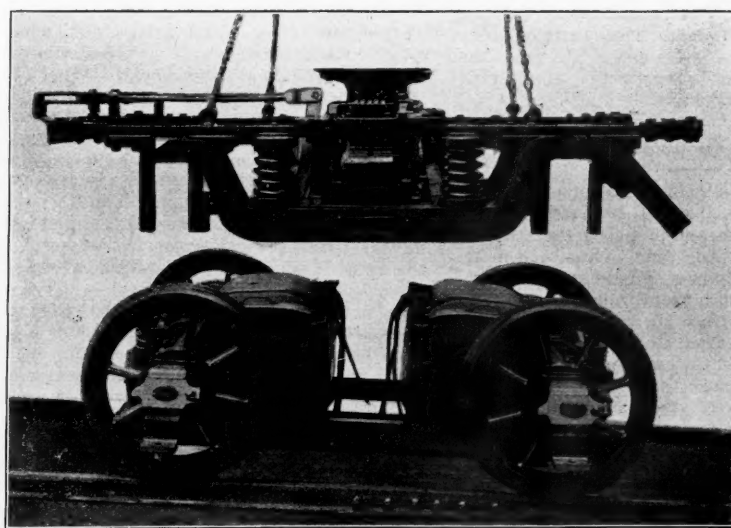


Fig. 4.—Truck with Electric Motors for Heavy Service—Trucks Designed and Built by the Baldwin Locomotive Works.





## Some of the Problems in Train Braking.

By G. L. Wilkinson, U. S. Patent Examiner.

The quick-action air brake is a most efficient solution of what for many years was an extremely difficult problem in railroad braking, namely the powerful and substantially simultaneous application of the brakes on all the cars of a train either by the engineman, or by a trainman on any car, or automatically by the parting of the train. There are, however, other problems which have long engaged the attention of brake experts and still remain incompletely solved.

It is a well established fact that the greatest retardation is obtained by applying the brake shoes with a force as great as possible without "skidding" the wheels. The regulation of the engagement between the brake shoes and wheels throughout a train so that at each instant of braking, each shoe will be forced against its co-operating wheel with the greatest possible pressure insufficient to stop the rotation of the wheel, constitutes the greatest problem confronting those who are striving to perfect the railroad brake. The magnitude and complexity of this problem becomes apparent when the varying conditions existing during the braking of a train are considered.

The first essential to quickly stopping a train is that all of the cars should be equipped with brake apparatus capable of giving a uniform braking action throughout the train upon a given reduction in the train pipe pressure. Many accidents are occasioned by the parting of trains due to the sudden jerk incident upon the uneven application of the brakes on adjoining cars.

It will doubtless be some years before our freight trains will be composed entirely of cars equipped with automatic air brakes, and until all freight cars are so equipped the accidents and loss of life among railroad employees due solely to the absence of apparatus adequate to stop the trains within the shortest distance possible will continue, but with diminishing frequency as the number of cars in each train equipped with air brakes increases. The act of Congress, approved March 2, 1893, makes it unlawful to run any train in interstate commerce "that has not a sufficient number of cars in it so equipped with power or train brakes that the engineman on the locomotive drawing such train can control its speed without requiring brakemen to use the common hand brake for that purpose." While this law does not require all freight cars to be equipped with "power or train" brakes, and hence will not directly accomplish the reduction of accidents to a minimum, yet it will doubtless result in practically all freight cars being supplied with air brakes.

The economy which has been found to result from the use of air brakes will materially hasten their application to all freight cars. The economy consists in reducing the number of wheels destroyed in service by the uniform distribution of the retarding force over many wheels instead of confining it to a few wheels, as is the case when hand brakes are used; in the saving in operating expenses due to the decreased number of brakemen necessary; and in the reduction in the number and cost of accidents.

An important factor in producing a uniform retardation throughout a train is the character of the brake shoes. Although a train may be equipped with apparatus which will produce an even brake shoe pressure when the train pipe pressure is reduced a given amount, yet the retardation will be uneven unless the brake shoes are of the same character, owing to the fact that the friction resulting from a constant pressure differs according to the material composing the shoes.

The material of which brake shoes should be made to secure the best results is a subject which has received much attention from the brake experts. While it is desirable that the material should be so durable as to avoid too frequent renewal of the shoes, and that it should wear away the tread of the wheels as little as possible and thereby promote the longevity both of the wheels and brake shoes, it is of far greater importance that a material should be used which will produce the most efficient braking action. A single wreck avoided would be more desirable even from an economical standpoint than that the brake shoes should have a low initial cost, and wear well without cutting or injuring the wheels. The greatest retardation for a given constant pressure is derived from a brake shoe the material of which gives the highest mean and the lowest maximum coefficient of friction, inasmuch as the brake shoe pressure must be limited by the maximum value near the end of the stop in order to avoid skidding of the wheels, while the mean value determines the retardation effected in stopping the train. No metal has been found which does not develop, under certain conditions of braking, one or more objectionable features. The inventors have consequently during recent years devised numerous brake shoes consisting either of a combination of metals or of a composition material. Some of these shoes, when subjected to the rigid tests of the Master Car Builders' committee, as well as in actual use, have been found durable and efficient.

The average train comprises cars of various ages and degrees of service, consequently the strain upon the rods and levers connecting the brake cylinder pistons with the brake beams, and the wearing down of the brake shoes, have produced more slack in the brake gear of some cars than in that of others. The existence of more or less slack is responsible for one of the greatest difficulties in making quick and smooth stops, especially on long trains, as the uneven distribution of retarding power produces unequal reduction in speed at different portions of the train, which results in shocks and in a loss of available brake shoe resistance. The presence of slack necessitates a more extended movement of the piston in order to bring the shoes into contact with the wheels and to effect this increased throw of the piston a greater space within the brake cylinder must be filled with compressed air which necessarily reduces the pressure per square inch and lessens the force with which the shoes are applied to the wheels. A 10-lb. train pipe reduction gives a brake cylinder pressure of 43 lbs. with a 5-in. piston travel, while the same train pipe reduction gives only 19.5 lbs. brake cylinder pressure with a 9-in. piston travel. This difference in throw with a 10-in. piston represents a total loss of 1,846 lbs. on the push rod in braking a single car, or in other words, when the amount of slack requires 4 in. additional throw of the piston to apply the shoes to the wheels, the braking power is reduced to considerably less than one-half of that which would be available were the slack eliminated. Reliable tests have disclosed that a 21-lb. reduction with a 9-in. piston travel gives a brake cylinder pressure of 43 lbs., while a 10-lb. reduction with a 5-in. travel gives the same cylinder pressure. This comparison shows that the disadvantages resulting from a long piston travel, in loss of time in applying and releasing the brakes, in waste of compressed air, in additional wear on the compressor, and in decreased power of the brakes, due to the lower maximum power attainable, are by no means inconsiderable.

Some very ingenious devices have been invented to automatically remove this continuously occurring slack. They are operated in applying and releasing the brakes either by the excessive relative movement of various parts of the brake gear, or by the movement of some part into engagement with a fixed actuating device, or pneumatically. These adjusters without any attention from the trainmen take up the slack as fast as it occurs and thus maintain the predetermined relation between the compressed air flowing from the auxiliary reservoir into the brake cylinder, and the power exerted upon the wheels by the brake shoes.

The many requirements which a practically successful automatic slack adjuster must comply with have prevented their general use, and at present slack is removed from most cars by the slow operation of adjusting by hand the dead lever in its guide. The great advantage which has been found in practice to result from the use of automatic slack adjusters should lead to the general adoption and extensive use of those adjusters which best meet the requirements, even though they are not perfect in every particular. Until all cars are equipped with successful means for automatically eliminating slack, the greatest possible brake shoe pressure throughout a train cannot be made available, and the problem of stopping a train within the shortest distance cannot be solved.

Another feature which has a material bearing upon the attainment of the greatest retardation for each car is the hanging of the brake beams. It has been long known that the weight of a car is unequally supported by the several pairs of wheels when its momentum is retarded by an application of the brakes. This is due to the inertia of the car tending to rotate it about an axis through the center plate of the forward truck, and also tending to rotate the rear truck about an axis through the point of contact between its front pair of wheels and the rails. The former tendency shifts a small part of the weight of the car from the rear truck to the forward truck, while the latter tendency shifts a part of the weight normally supported by the rear pair of wheels to the forward pair of wheels of the rear truck. The rear pair of wheels of a car, therefore, supports less weight upon the rails than any of the others, and consequently the brake shoe pressure upon each pair of wheels must be limited to an amount insufficient to skid the rear pair of wheels of the rear truck. As the greatest retardation for each car would be derived from proportioning the pressure at each brake shoe to the weight carried by the particular wheel engaged by such brake shoe, a loss in retardation results from limiting the pressure for all the brake shoes to that which can be exerted against the wheels sustaining the least weight.

Mr. R. A. Parke, in his very able paper presented at the November, 1897, meeting of the New York Railroad Club, fully explained how this loss in retardation, due to the pairs of wheels supporting unequal weight during braking, could be greatly lessened by a slight change in the arrangement of the brake beam hangers. His investigation disclosed the fact that when the brake beams were located between the pairs of wheels of the trucks, a proper

inclination of the hangers would proportion the brake shoe pressure upon each pair of wheels to the pressure of that pair of wheels upon the rails. The engagement of the brake shoes with the forward pair of wheels forms a sort of toggle joint, which, owing to the upward movement of the peripheries of the wheels in contact with the shoes, produces a powerful pressure between the brake shoes and wheels in addition to the normal braking force. The inclination of the hangers has the reverse effect upon the rear wheels, as they rotate downwardly against the shoes, and tend to swing them away from the wheels, which partially counteracts the effect of the normal braking force. The rotation of the wheels corresponds to the direction of movement of the car, so that the rear pair of wheels becomes the forward pair, when the direction of the car is reversed. The effect of the inclined hangers upon the two pairs of wheels of the truck is correspondingly reversed, so that the leading pair of wheels is always subjected to the greater brake shoe pressure, and the rear pair to the reduced pressure.

The trucks of a train of Canadian Pacific cars were equipped with inside brakes, the hangers of which were 18 in. long and were inclined 15° 45' to the tangent at the center of the brake shoe. The braking efficiency of this train was tested, and after making due allowance for errors in estimating the speed, the stops made were apparently about 15% shorter than any previously recorded stops under similar conditions.

This arrangement of brake beams and their hangers so proportions the brake shoe pressure to the weight supported by the pair of wheels that a greater brake cylinder pressure is possible without skidding the wheels, and consequently the total retardation of each car is increased, and the distance within which the train can be stopped is correspondingly lessened.

It is important that the brake shoes should be so hung that they will always remain at a constant distance above the rails regardless of the gross weight of the car. If the shoes are lowered when the car is loaded they will in breaking engage the peripheries of the wheels at a lower point, thereby necessitating a longer throw of the brake cylinder piston, which results in a diminution of braking power at a time when increased power is needed. Another disadvantage resulting from so supporting the shoes that their position above the rails varies according to the compression of the car springs is, that the greater weight supported by the front wheels of the trucks, due to their tendency to overturn about the point of contact between the front wheels and rails when the brakes are applied, lowers the front shoes and elevates the rear ones, thereby decreasing the pressure with which the shoes engage the front wheels, and increasing the pressure between the rear shoes and their co-operating wheels, a result the reverse of that desirable for efficient braking.

The relation of the adhesion between the wheels and rails to the weight supported by the wheels forms an important factor in braking freight trains. The frictional resistance between the brake shoes and wheels should approach as nearly as possible without exceeding the adhesion between the wheels and rails, in order to most effectively impede the momentum of the car. It is evident that a given braking power would produce a brake shoe resistance less than the adhesion between the rails and wheels of a loaded car, but in excess of the adhesion between the rails and wheels of the car when empty, and consequently the reduction in train pipe pressure on a train composed of loaded and unloaded cars must be so limited that the resulting braking pressure will be insufficient to skid the wheels of the unloaded cars. Great annoyance and inconvenience as well as much damage has resulted from applying the brakes on mixed trains or loaded and empty cars with a pressure permitting the revolution of the wheels of the loaded cars but locking the wheels of the empty cars, thereby flattening the wheels and necessitating their removal.

To avoid such occurrences the braking force on freight cars is now limited to 70 per cent. of the weight of the empty cars, which insures the wheels of empty cars from being flattened, but which provides a braking force much less than would be available on the cars when loaded. This rule, while avoiding the objection of flattened wheels, threatens to create a greater objection, now that freight cars of 100,000 lbs. capacity are coming into use, inasmuch as the allowable braking force of 70 per cent. of the weight of the empty car, which is 30,000 lbs., gives a braking force of only 16 per cent. of the weight of the car when loaded, which is inadequate to control a train composed of such loaded cars. It is evident that this rule will have to be modified to permit the use on big freight cars of load regulated devices, which, while limiting the braking force on empty cars to 70 per cent. of their weight, will permit a greater braking power when the cars are loaded.

Numerous devices have been invented for varying the brake shoe pressure according to the loaded or unloaded condition of the car. Many of these devices operate automatically to increase the brake

(Continued on page 713.)





ESTABLISHED IN APRIL, 1856.  
PUBLISHED EVERY FRIDAY,  
At 32 Park Place, New York.

#### EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

On another page, in the department of Meetings and Announcements, the reader will find the regular ticket of the American Society of Civil Engineers. Of course comparisons are notoriously odious and we shall avoid making any. It is enough to say that this is a very fine ticket and ought to command not only the approval but the enthusiasm of the great body of the Society. In the same note on the affairs of the Society is recorded the fact that at last the Board of Direction has decided to discontinue the use of the 24-hour system of time notation in the publications of the Society. The reader who has any interest whatever in this matter will possibly remember that we have tried for some years to bring this about, for reasons which it is not necessary now to repeat. The effort to make the 24-hour system at all popular was hopeless from the first—almost as hopeless as the effort of the French revolutionists to change the calendars of civilized society.

#### Metal Draft Beams.

Everyone who thinks about the subject must for some time have been impressed by statements that the draft rigging of freight cars is becoming inadequate to the present requirements, and when one considers the increase in the size of locomotives and trains, it would be surprising if the draft gear designed for light equipment was sufficiently strong for the heavier service. About two years ago Mr. Westinghouse said that "over 60 per cent. of all cars standing idle awaiting repairs have defective draw gear," and so far as we know the statement has never been proved untrue, although frequently questioned. The gentleman who writes the general discussion on metal draft-beams, in the article printed in this issue, has exceptional facilities for collecting such information, and he puts the proportion at from 60 to 70 per cent. But we are not told how these breakages are divided between the couplers, draft rigging and draft timbers.

It is expected that the recent discussion of the coupler question and the framing of specifications by the M. C. B. Association will in time result in fewer coupler breakages. Then the later designs of draft rigging all provide that the pulling and buffing forces shall be taken by the draft timbers before the springs fully close, which doubtless will reduce the breakage of draft springs; but at the same time the spring capacity is necessarily so small in the ordinary rigging that all shocks of any consequence must be borne directly by the draft timbers. This, of course, is entirely wrong in principle, as the yielding resistance should be at least sufficient to care for the heaviest shocks met in ordinary service; but it is hardly necessary to add that the cost of such a buffing device has so far prevented its extensive use.

If the common forms of draft rigging are to be retained, we are led to the question of using a stronger construction between the rigging and the

car underframe, necessarily implying some form of metallic draft beam. This is discussed elsewhere in this issue by one who has made a careful study of the question. We have also tried to bring together all the designs of metal draft beams so far made, and these, with one exception, accompany the discussion; this last design will be shown in a later issue and in one form makes use of malleable iron castings and in another rolled steel sections.

It is probably safe to say that metal draft beams are still in the experimental stage on all roads excepting the Lake Shore & Michigan Southern and the New York Central, where they have come to be used regularly both for new cars and in repair work. Malleable iron so far has been most used for this purpose, although some beams have been made of cast steel, and it is evident that rolled sections might readily be used with some kinds of draft rigging. From replies received to our inquiries, it can be inferred that both the malleable iron and cast steel beams illustrated are sufficiently strong for the purpose, which statement in connection with the drawings may be useful as a basis for designers who may be called upon to make recommendations for metal draft beams to suit special cases.

The question of the relative economy of the metal and wood construction is a difficult one to estimate even roughly, and plainly it must be estimated from a comparatively short trial, as it is impracticable to wait from 30 to 40 years, the supposed life of the metal beams, before reaching a conclusion. Assuming that a set of oak draft timbers costs \$1.30 and that metal draft beams will last twice as long as the car, our correspondent shows that, on a replacement basis for scrap and "other things being equal," a road could afford to pay for metal draft beams \$1.88 extra per box car, and \$2.27 extra per coal car. Plainly these additional amounts would not be sufficient to pay for any suitable kind of metal construction. He states, however, that often the follower lugs or stops and sometimes the carrier irons and other pieces are intrinsic parts of and should be credited to the cost of metal beams. But, further, it will at once occur to the reader that the principal things to be gained by the use of metal draft beams are fewer breakages and delays, less loss of the service of the car, and a reduced cost for maintenance, which of course would tend to further offset the interest charges on the larger investment for the metal beams. Plainly the factor, "other things," which must be accounted for, may vary for different roads, and different styles of metal beams and is not easily determined for a general case, but could readily be computed for any particular design of draft beam if the special conditions of a road were known. When we reflect on the nature of the strains to be endured by draft-beams, and how ill-suited wood is for a construction to stand these strains, it seems self-evident that metal draft-beams will be found economical.

#### Annual Reports.

Reading.—The annual report to June 30, now at hand in advance sheets, covers the operations of the three distinct companies which make up the Reading organization. These are the Philadelphia & Reading Railroad, the Coal & Iron Company and the Reading Company, which is the controlling corporation, owning practically all the stocks of the other two, as well as the equipment used by the railroad and issuing its own securities, its shares being the only Reading stocks held by the public. So far as gross is concerned, the results of the past year's operations recorded a further increase in the prosperity exhibited in the first annual report, to June 30, 1898. The aggregate increase in gross then was \$2,853,000, and to this \$1,626,300 has now been added. The unsatisfactory part of the showing is that it required an increased expenditure of \$1,807,600 to secure the higher revenue in 1899 so that net earnings and the balance of the items of the income account show losses as compared with last year:

The surplus over all charges was \$1,165,209 in 1899 or about \$211,000 less than in the previous year, and was equal to a little over 4 per cent. on the first preferred shares of the Reading company. That balance, however, was on gross earnings of nearly \$47,000,000, the working charges alone absorbing nearly 80 per cent. of this amount. The revenue results for the last two years are shown in the following table:

	1899.	1898.	Inc. or Dec.
Gross receipts .....	\$46,882,908	\$45,256,624	Inc. \$1,626,284
Oper. expenses .....	36,643,847	34,836,260	Inc. 1,807,587
Net earnings .....	\$10,239,061	\$10,420,354	Dec. \$181,303
Charges and taxes .....	\$9,073,852	\$9,043,944	Inc. \$29,908
Surplus .....	\$1,165,209	\$1,376,420	Dec. \$211,211
Accident fund .....	224,744	.....	Inc. 224,744
Balance .....	\$940,465	.....	.....

Out of the 1899 balance shown above, an appropriation of \$224,744, representing the year's surplus of the railroad company, was set aside as a reserve

accident fund, to provide for the payment of claims arising out of accidents, etc.

The railroad and coal companies each contribute about equally to the total gross earnings, the income of the former in 1899 being \$23,002,588, and of the latter, \$23,643,838. These figures represent increases of \$1,015,754 and \$734,285 respectively. The Coal & Iron company usually has a deficit after its working charges, but the improvement in the coal business, has enabled it to materially improve its net income as well as its gross, so that in 1899 it had a balance after the payment of all fixed charges of \$423,000, against a deficit of \$53,525 in 1898, and of charges amounts in previous years. These balances, it should be stated, were after including in expenses, \$377,926 in 1899 and \$630,624 in 1898, for extraordinary colliery improvements. This work has been carried on systematically since the reorganized company secured possession of the property. Its effect is seen in the lessening cost of coal per ton mined. The total anthracite tonnage of the Coal & Iron Company in 1899 was 8,184,000 tons, an increase of 556,968 tons, or 7.3 per cent. President Harris points out that anthracite consumption is not growing rapidly, because it is more costly than bituminous coal and this cost cannot be materially lessened. He therefore does not anticipate anything more than a moderate increase in the Reading's hard coal business, but looks for a largely increased bituminous coal tonnage, the numerous manufacturing establishments in the Reading's territory furnishing a large market for that product.

The statistics of the railroad company's business in the present report, as in that of last year, furnish interesting confirmation of this point. The increase in 1898 in anthracite tonnage was 234,400 or 2½ per cent., and in bituminous coal was 1,084,000 tons or 44½ per cent., and these gains have been followed in the past year by increases of 69,100 tons and of 684,600 tons in hard and soft coal respectively. In reviewing the trend of traffic for some years past, President Harris points out that the present anthracite tonnage is practically the same as that carried in 1894, while soft coal freight has increased from 1,690,000 tons in that year to 4,688,000 tons in 1899. A similar growth is traceable in merchandise traffic, which from 8,250,000 tons in 1894 has grown to 12,750,000 tons. Merchandise traffic furnished more than half, or \$661,719, of the total increase of \$1,000,000 in the railroad company's gross earnings last year.

The text of the President's report is an unusually complete summary of a year's operations, summarizing the various improvements carried out or put under way during the year. Besides this recital of betterment work, President Harris enters upon a lucid account of the reasons for various developments in the policy of the company, the condition of the property when it was taken over by the new company, the work necessary to be done to bring it into an up-to-date condition, and the circumstances determining the relations of expenses and profit. The work which has been done to improve the economical value of the railroad, he says, has borne considerable fruit. "Measured by the cost of transporting one ton one mile, the operations of the year ending June 30, 1899, show a gain of 24 per cent. over the work of the year ending November 30, 1894, and a gain of 35 per cent. over the year ending November 30, 1889."

This work of increasing the efficiency and promoting the economical operations of the road has called for considerable expenditures on the roadway, shops, terminal facilities and equipment since the property was taken over by the present company. The work has for the most part been included in operating expenses and the largest share of the increase in the railroad's working charges last year was due to heavier maintenance expenses as compared with 1898. Transportation cost increased \$471,000, but maintenance of way charges were \$564,000 higher. The cost of maintenance of way is reported as \$100,000 less, but "other expenses," amounting to \$1,598,000, all of which, except \$95,000, contributed to the insurance fund, was for maintenance work, increased \$354,000. The expenditures for equipment renewals charged to this account were \$665,870, \$176,000 less than last year, while roadway improvement and renewal charges were \$337,370, against \$360,000 in 1898.

In addition to these charges, \$501,000 was spent for new equipment out of capital account, which apparently indicates that the railroad company proposes to acquire an equipment of its own; all that it is now using is leased from the Reading company, under a guarantee to keep unimpaired its carrying capacity and working efficiency. Further large additions to equipment, it is stated, will be necessary in the present year. Some of the traffic statistics showing the more important changes of the year follow:

	1899.	1898.
Ton mile rate .....	687 c.	714 c.
Tons anthracite moved .....	8,533,693	9,464,598
Tons soft coal moved .....	4,201,622	3,517,190
Total tons one mile .....	1,468,237,000	1,390,656,000
Average train haul (miles) .....	106.9	107.1
Ton mile rate .....	951 c.	1,042 c.
Tonnage moved .....	11,386,000	9,882,600
Tons one mile .....	822,615,000	687,213,600
Average train haul .....	72.25	69.68

We quote elsewhere a little order recently issued by Mr. Potter, of the Long Island, as to certain points of manners among his trainmen. He directs all em-



ployees to use the term "madam" instead of "lady;" also he tells them that employees must not take hold of a passenger except when it is necessary. We have long held the doctrine that the average human being would rather say the right thing than the wrong thing, and would rather do the right thing than the wrong thing, in any relation of life. If we go through to the "ultimate analysis" we find that this must be so; if it were not so human society would go to pieces. This seems a simple and self evident proposition. But it is also evident that the average manners of the great North American trainman are not polished. They are improving, but they are still far below the standard of manners of men doing similar work in Great Britain. This is a mere question of the older and the younger civilization, just as the average crowd of business men in London is better dressed than a like number of men in New York, and the average crowd of business men in New York is better dressed than a like number of men in Chicago. If we disregard these little matters of manners and dress we thereby classify ourselves for the information of others. We inform them about what stage of civilization we have reached. All of this being so, it is not only appropriate that railroad officers should instruct their subordinates in such little points as Mr. Potter has singled out, but it is their duty to instruct them.

The first of August was the tenth anniversary of the introduction of the zone system on the Hungarian State Railroads, and the following figures are given to illustrate the results which have followed. The number of passengers carried (000 omitted) and the length of railroad worked have been:

	1888.	1889.	1890.	1892.	1896.	1898.
Miles ..	2,829	3,158	3,215	4,755	4,876	4,956
Passeng.	5,045	8,915	15,091	28,024	35,442	33,146

With an increase of 75 per cent. in mileage from 1888 to 1898 there was an increase of 557 per cent. in the number of passengers carried. The passenger earnings meanwhile increased 215 per cent. The maximum travel and earnings were in 1896, when a great millennial celebration of the establishment of the Kingdom of Hungary greatly stimulated travel. The passenger mileage is not reported. Per mile of road, the number of passengers has increased 270 per cent., and the passenger earnings 77 per cent. The earnings per mile were only \$1,003 in 1888 and rose to \$1,775 in 1898. The passenger business of the Hungarian railroads is still light, and considering the population and the railroad mileage is very light; but it has undoubtedly been enormously stimulated by the low rates of the zone tariff. Those who have paid attention to this tariff will remember that tickets at zone rates are not sold for journeys through Budapest. You must pay for a ticket to Budapest and for one for the distance beyond Budapest, though very likely the whole distance, if on a route not passing the capital, would call for no more than the Budapest rate. It is now reported that other places in the Kingdom are to be similarly favored, which will be equivalent to limiting the distances in the longer zones.

The volume of freight moving on the railroads throughout the country continues to be large, in practically all departments, and the newspapers in all the principal cities report the railroads as using all their cars and engines constantly to the fullest capacity. The receipts of grain at Chicago in September were the largest on record for that month except in 1897. One officer of an Eastern road in Chicago this week said that he had refused 1,000 carloads of grain within a week, owing to inability to promptly secure cars. The Pennsylvania is reported to be short 5,000 cars. All roads appear to be behind in filling shippers' orders for cars, although they are naturally reluctant about telling the degree of shortage. In New York the grain merchants say that the New York Central and the Erie have refused to make large contracts, on the ground that their supply of cars is insufficient and that the terminals are already nearly blockaded. An officer of the Erie told a reporter that he believed the present activity in freight traffic would last at least 10 months. A general agreement has been made among the roads east from Chicago to advance rates on grain Nov. 1, but the tariffs are not yet published. It is said that the rate on export corn will be on the basis of 20 cents, Chicago to New York, and on domestic corn 22 cents. It is reported from Duluth that the lake lines will be unable to take all the business offering for the East this year and that many thousand tons of merchandise will have to be sent all rail. Large quantities of flour are now waiting at Duluth.

#### Some of the Problems in Train Braking.

(Continued from page 711.)

shoe pressure as the springs interposed between the car body and trucks are depressed by the load, and to decrease the braking pressure when the unloading of the car permits the expansion of the supporting springs and the consequent elevation of the car body above the trucks. The variation in the brake shoe pressure is effected either by the adjustment of the leverage, or by the regulation of the brake

cylinder pressure, or by the coupling and uncoupling of additional brake cylinders to the brake rod.

The equipment of freight cars with means for automatically proportioning the braking power according to the varying gross weight is very desirable, in order that the greatest attainable retardation may be rendered available. Many accidents would then be avoided by the decreased distance within which the trains could be stopped, and the great number of flattened wheels, now due to the engineman resorting to an emergency application to control his train, would be greatly reduced.

Experience and experiment have demonstrated that a braking force insufficient to skid the wheels when the brakes are first applied will cause the wheels to slide upon the rails when the speed has decreased. This is due to the increase in the coefficient of friction, that is, the ratio of the resistance to slipping between the brake shoes and wheels to the pressure with which the shoes are forced against the wheels, as the velocity diminishes. A braking force over four times as great as the weight supported by the wheels may be exerted without skidding the wheels when the train is running at a speed of 60 miles an hour, while a third of this force is sufficient to lock the wheels at a speed of 15 miles.

The braking force should therefore be most powerful when the brakes are first applied, and should be diminished as the speed decreases, in order that the greatest brake shoe pressure possible without skidding the wheels may be availed of at each instant of braking and the maximum retardation produced.

About five years ago the fact that the efficiency of the brakes could be greatly increased by proportioning the braking power to the speed, was rendered practically available by the invention of certain attachments to be applied to the automatic brake apparatus on trains which normally run at a high rate of speed. At present such high speed brake apparatus is in regular service on several fast trains.

Comparative tests have conclusively proved the great efficiency of the high speed brake, which enables a train at a speed of 60 miles an hour to be stopped in a distance about 450 ft. shorter than is possible with the ordinary quick-action brake. A decrease of nearly 30 per cent. in the distance within which a train can be brought to a standstill is indeed a great step forward in perfecting the railroad brake.

In the present high speed brake the automatic reducing valve is spring controlled, and therefore in a given interval of time reduces the brake cylinder pressure a predetermined amount estimated to approximately correspond with the reduction in speed during such interval. The tension of the spring being based upon an assumed initial speed and upon an average coefficient of adhesion, the reducing valve cannot vary the initial braking pressure according to the rate of speed when the brakes are first applied, nor can it reduce the pressure quickly or slowly according to the condition of the rails. It has been found by investigation that one-half the pressure which may safely be retained in the brake cylinder without skidding the wheels when the condition of the rails gives a coefficient of adhesion of 30 per cent. of the weight, will lock the wheels when the rails are so moist as to afford a coefficient of adhesion of only 15 per cent. of the weight. The spring controlled reducing valve, if arranged to maintain the greatest pressure practicable for braking when the rails are in the most advantageous condition, will skid the wheels when the rails are in less favorable condition, while on the other hand, if the reducing valve is adjusted to only retain a pressure insufficient to skid the wheels when the adhesion is lowest, the brakes will not be applied with the greatest efficiency, when the condition of the rails is more favorable.

The adhesion between the wheels and rails is increased in emergency stops by the discharge of sand upon the rails, but it is evident that the use of sand will not result in a uniform coefficient of adhesion with all conditions of the rails.

The high speed now attained by passenger trains makes it essential that every ounce of braking power should be availed of, inasmuch as a few feet less in the distance required to stop the train may avoid a wreck. It is therefore of the greatest importance that the brakes should be applied in the most effective manner, that is, with the greatest brake shoe pressure possible without skidding the wheels, which can only be accomplished by accurately proportioning the braking force to the decreasing speed and to the adhesion between the wheels and rails.

#### American Society of Railroad Superintendents.

This society held its annual meeting at the Holland House, New York City, on Tuesday last. The attendance was small and the session was a short one, but the discussion was interesting throughout.

The first business was the report of the Executive Committee, the principal recommendation of which was to the effect that the prosperity of the Society requires that there should be a Secretary to give his whole time to the work. The Treasurer reported as follows: On hand at beginning of the year, \$1,346; received from advertising, from sale of cate-

chisms and from dues, \$1,097; total, \$2,443; expenses, \$1,606; balance on hand, \$837. The Secretary reported the membership as 221, slightly less than a year ago. The catechism on the Standard Code, issued by the Society several years ago, is now out of print. A new catechism, based on the revised Standard Code, ought to be prepared, and it would probably be a source of income. The Secretary says that a condensed record of the Proceedings of the Society, from its origin to the present time, could be compiled and published at a cost of \$3,000 for 1,000 copies. The Secretary had asked members by circular to give their views about reorganizing the Society. The membership now represents a large majority of the mileage of the country, but includes only one-quarter of the men eligible. Only a few replies were received to the circulars, but most of those few favored the proposition to have the secretaryship made a more important office.

Discussion of the Secretary's report showed that a majority present believed that committees should be made smaller, should be made up of men living near together, so that they would be sure to do something, and should be more numerous, so that the matter for discussion before the Society could be better subdivided. On motion of Mr. J. K. Russell (L. S. & M. S.) the Executive Committee was given broad authority to select subjects and appoint committees, ad libitum, to report on them. Mr. Sully (A. C. L.) proposed that one committee should consider the question of codifying statute laws affecting railroads, especially such laws as affect superintendents and their departments in every day work.

The Committee on Transportation presented a report embodying the results of an inquiry by the Committee into the methods pursued by a number of prominent railroads in the examination of employees. Questions were sent to a large number of railroads and answers were received from officers representing 96,000 miles, scattered all over the country. The members of the Committee had been impressed with the fact that on many roads more care seems to be taken to determine the physical condition of the men than to find out their mental qualities. The last revision of the Standard Code of the American Railway Association makes a radical departure, as, for instance, in the flagging rule, by omitting details and thus putting an important additional responsibility on the employee. The flagman must exercise good judgment and must be very well posted as to the grades and curves of his road. Some roads, while examining men with considerable care on their entrance into the service, give no attention afterward to the question of the continued proficiency of the men. Equipment and structures are examined frequently and regularly, but our most important equipment, the human machine, is allowed to go without much attention. One prominent road, in making physical examinations of applicants for employment rejected 18 per cent.; is it not reasonable to suppose that a mental examination will also show a considerable percentage of failures? The general neglect to see that employees have sound minds in sound bodies is a weak spot in the railroad management.

The summary of the answers to the questions sent out shows that on eight lines (11,310 miles) men are examined at regular periods of from two months to one year; and on three lines (3,558 miles) at periods varying from one to three years. The other roads answer "no examinations," or something about the same as that. All roads which make examinations report that such tests are believed to be valuable. Seven lines (9,442 miles) declare that every-day service is a sufficient test of the competency of the men.

Twenty-five lines examine men on physical characteristics of the road. Some require only a knowledge of grades, others location of bridges and culverts; and three require a careful, detailed examination on all physical conditions.

Some lines admit that examinations are desirable, but believe that they cost too much. To this the Committee replies that but little expense is necessary. The report says:

It is not necessary to bring in men and examine them upon any considerable portion of the rules. A small number of test-questions, not exceeding three or four, having been prepared by the trainmaster, or chief dispatcher, of the division where the man is employed, the man is called in, whenever most convenient, and requested to sit down and answer in writing the questions prepared. As no man can tell upon what rules he will be quizzed, and as the sets of questions are never alike, the men are compelled to keep fully posted on all the rules and also upon their knowledge of the physical characteristics. The questions can also cover, in the case of conductors and enginemen, hypothetical derailments and small breakdowns on the road, which involve the clearing of track, to save delay in sending for wrecking outfits. Upon a division of 250 miles, where the conductors and enginemen were called up, three or four at a time, whenever they were found on a "lay-over" at terminals, it was found that the answers to a list of questions were written out in less than a half hour, and the whole division covered in several months' time, and a very marked interest manifested by the men.

The necessity for exact knowledge of the physical characteristics of roads is apparent, if the code-rule for flagging is generally adopted. The judgment of the flagman is entirely based upon his acquaintance with the grades, curvatures and other physical peculiarities which may affect train movement. The



rigid adherence to a system which compels the man to acquaint himself with such matters will tend to secure immunity from that class of accidents commonly due to ignorance. Upon some roads, tests of such knowledge are very thorough.

A complete knowledge of the physical characteristics is valuable, not only to the employee in train service, but, as well, to those who direct train movement. Train Dispatchers can do much more intelligent work, if their mental equipment includes a knowledge of all the physical conditions of the territory they govern. On one of the important divisions of a leading line, each Dispatcher is required to spend one week in each sixteen weeks out on the road, under pay, riding only on locomotives or freight trains (not on passenger trains), carrying with him a profile of the line and familiarizing himself with track arrangements, etc. The results gained are said to be highly satisfactory.

The Committee deems it very desirable to examine employees in the track, and the bridge and building departments, as these men have important duties in connection with the train service. The Committee deems physical examinations necessary at frequent intervals.

Summing up, the Committee holds that tests on the rules and on the knowledge of the physical characteristics of the line should be made at frequent intervals and without loss of time to the employee; complete physical examinations are desirable when a man is hired or promoted. Eyes of all classes of employees should be tested at frequent intervals, and it is desirable that all railroads adopt the same method.

An abstract is given of all the answers received. Some of these appear to be rather indefinite, as, for instance, "men are not examined on the train rules, but are quizzed once in a while by trainmasters." Another examines the men orally as often as the Board of Examiners is able to reach them. On the Pennsylvania Lines west of Pittsburgh men are examined orally when promoted; and on certain rules must show a proficiency of 75 per cent. The Atlantic Coast Line (1,555 miles) is the only one on which we notice mention of the use of a catechism.

The intervals at which men are examined, more or less thoroughly, on certain roads, are as follows: Wabash, two months; Cincinnati, New Orleans & Texas Pacific, two months; Chicago, Rock Island & Pacific, six months; Wisconsin Central, one year; Cleveland, Lorain & Wheeling, one year; Chicago, Burlington & Quincy, one year; Atlantic Coast Line, one year; Plant System, two years, and Baltimore & Ohio, three years.

The members of this Committee are: A. W. Johnston (Chairman), (N. Y. C. & St. L.), W. I. Allen (C. R. I. & P.), H. W. Clarke (Mobile & Ohio), S. Sanborn (Chicago & Northwestern), J. K. V. Agnew (Chicago & West Michigan), W. A. Garrett (Wabash), J. C. Moorhead (Erie), W. C. Nixon (A. T. & S. F.), Thomas Owens (Duluth & Iron Range).

The discussion on this report began with arguments as to whether the Superintendent should select a bright man and then have him trained in the code, or should adopt the machine method of taking any man who could pass a perfect examination in the code and then find out afterward whether or not he had a suitable equipment of gumption. Of course the point was brought out that the man best posted on the letter of the rule often proved a poor man on the road; but the other side made clear the importance of a code of rules, and exact knowledge on them, to make the practice uniform and to keep the men intimately acquainted with features of the work which to them may seem secondary or of minor importance. One member believed that the adoption of the Standard Code, with its tendency to make men satisfied with book-learning, had lowered the standard of trainmen. Mr. A. J. Davidson (St. L. & S. F.) was surprised to find, from the Committee's report, that so few roads had frequent examinations of their men. Only by repeated examinations can train and station men be brought to the highest standard, and they should be examined every six months. The speaker cited examples of accidents from lax requirements in knowledge of what are called unimportant rules.

Mr. Russell spoke of the increasing intelligence of freight trainmen. There are now many bright individuals in this class and some of them are chosen as members of legislatures. Mr. Russell promises his men absolute adherence to the seniority rule, if the candidate passes a perfect examination, and as a consequence the men work hard to qualify themselves.

Secretary Hammond spoke of the importance of so phrasing rules that new men could easily comprehend them. His method in drafting a code was to try to make a good, readable description of the work that the employee would be required to perform, and then give the man a chance to read it over as many times as he might wish to. Readableness is more necessary than mere brevity, which often means stiffness.

Mr. Derr (Erie) stated that on his road, where the catechising of trainmen has been in vogue many years, there is a meeting each month, on each division, of the Trainmaster and the dispatchers, to discuss matters connected with train rules. In examining men a printed catechism is pretty closely followed, but not to the exclusion of any questions found necessary. Considering the question of nat-

ural ability, the speaker emphasized the need of selecting good men for the lowest positions. When, in making promotions, you feel it necessary to suspend the seniority rule in any case (because of indefinable deficiencies of natural ability or fitness) it is awkward business explaining why this is done; hence the importance of careful examinations at the beginning.

Mr. Beach (N. Y., N. H. & H.) expressed decided disapproval of the Committee's view that an examination on a few rules would test a man's knowledge of the whole code. A full and thorough examination is always necessary. Men do not read rules alike, and they differ in their interpretations, even where they agree on the form. One or two other members agreed with Mr. Beach, and the general tone of the discussion indicated that all agreed with him, but, on motion, the Committee's report was unanimously adopted.

A letter was read from Mr. W. C. Nixon (A. T. & S. F.) recommending the discussion of how to regulate the collection of revenue for switching at local stations, and the subject was referred to the Executive Committee for a report.

The time and place of the next meeting are to be decided by the Executive Committee. The election of officers for the ensuing year resulted as follows: President, W. L. Derr (Erie), Elmira, N. Y.; First Vice-President, M. J. C. Wrenne (N. C. & St. L.), Nashville, Tenn.; Second Vice-President, F. E. Dewey (D. & L. N.), Detroit, Mich. Members of Executive Committee, Charles B. Price, the retiring President (A. V.), Pittsburgh, Pa.; Seely Dunn (L. & N.), Russellville, Ky. Secretary C. A. Hammond and Treasurer R. M. Sully were re-elected. Mr. Hammond's address is Mount Vernon, N. Y.

#### The Automobile in France.

In the September issue of the North American Review is a very interesting paper entitled "Progress of Automobilmism in France." It is written by the Marquis de Chasseloup-Laubat, whom some of our readers will remember as having visited this country with the members of the French Society of Civil Engineers during the World's Fair, and of whom many have heard as an interested and intelligent student of engineering matters.

It is well known that the French have been persistent and enthusiastic in the application of mechanical power to moving vehicles over common roads, in other words, to what they call automobilism. M. de Chasseloup-Laubat describes in this article the experiences obtained in half a dozen of their long-distance trials. The tests have been severe and the outcome of the whole matter is that the petroleum motor "is hardy, relatively simple and readily run." There is a disagreeable odor unless care and skill is used in regulation. There is some danger from fire also.

The petroleum motor carriages so far built are a little feeble in starting, but "it is a good carriage for service in both city and country. For long runs it is actually the only one available." The steam road motor carries greater dead weight than the petroleum automobile, it needs a mechanic as fireman independently of the driver, its maintenance is complicated and difficult, but "it is relatively inexpensive, furnishes a steady power, can start up readily with a heavy draught and takes hills easily." For heavy traffic and broken country it seems to have its chief application. The electric carriage is simple in construction and easily run. It starts quickly and takes heavy grades well. It is noiseless and without vibration. The dead weight is large and the length of time required to recharge the batteries is a serious drawback. "It is, par excellence, the urban vehicle, especially for passenger traffic rather than for freight."

This brief summary of the opinions of the Marquis, which are the result of so much knowledge and experience, strikes us as being interesting and important.

#### TECHNICAL.

##### Manufacturing and Business.

Benjamin Watson, 66 Beaver St., New York, wants a narrow gage steam derrick car.

A. O. Norton, of Boston, maker of ball bearing jacks, has recently shipped a large order to Denmark. Within the past 30 days he has received several orders from Australia, South Africa and India.

The Cripple Creek Railway, of which A. H. Crocker is the General Manager, Boston Building, Denver, Colo., will ask for bids on rails about Oct. 20.

The Duluth & Northern Minnesota Railway, M. S. Smith, President, Detroit, Mich., will want some rails.

The Trade Paper Advertising Agency of New York has secured the services of Sam A. Elkington, who has been associated with trade journals of this country for the past ten years as advertising manager and advertising writer.

W. J. McBride has been appointed General Manager of the American Car & Foundry Co., taking effect Oct. 1, 1899. Mr. McBride will have general charge of all the affairs of the company, under the

direction of the Chairman of the Board, President and Vice-President.

The New York office of the King Bridge Co. has been moved from 501 Fifth Avenue to 95-97 Liberty St. Mr. Geo. E. Gifford still retains the management of the office.

The Harrison Dust Guard Co., Toledo, O., has among its more recent orders received one for 1,500 for the Wheeling & Lake Erie, another for 3,000 from the Michigan Central, and another for 720 from the American Car & Foundry Co., and for an additional 100 cars for the Detroit, Grand Rapids & Western.

#### Iron and Steel.

The Orient Steel Co. has been chartered in West Virginia and will build a plant in Allegheny, Pa., to make open hearth steel billets. Grant McCargo is President; Henry G. Wasson, Vice-President and Treasurer, and Leonard D. Davis, Secretary, all of Pittsburgh. The capital is \$10,000. The company will operate the old Jennings plant in Allegheny.

The Walter Steel Co., with a capital of \$100,000, has organized with the following as officers: Andrew Bryson, President, and Henry R. McElligott, Secretary and Treasurer. The company will make malleable iron and castings.

J. P. Dietz has bought in Cincinnati, O., a plot of land, 100 ft. x 200 ft. on Colerain Avenue, adjoining the Lodge & Shipley Machine Tool Company's plant, and will build a factory to make lathes and other tools.

The Olive Foundry & Machine Co. has been incorporated by Thomas M. Adams and W. B. Seaton, of Ashland, O., W. C. McKee of Hanging Rocks, and J. L. Anderson and F. C. Tomlinson of Ironton, O. The capital is \$30,000. They will operate in Ironton, where a plant has been bought. Mr. Tomlinson is President.

Joseph Wharton will build a blast furnace at Oram, N. J. Edward Kelly is manager.

The \$600,000 of capital stock of the Pennsylvania Malleable Co., which was recently organized in Pittsburgh, is said to have been over-subscribed. A plant is being built in McKee's Rocks, to make malleable castings. S. White is President and D. O. Holbrook Secretary and Treasurer.

The Rome Steel Co. is reported organized with Directors as follows: E. C. Carpenter, J. S. Dyett, F. L. Groff, M. G. Merritt, H. T. Dyett, A. F. Carpenter and J. H. Dyett. A factory will be built in Rome, N. Y., to make angles and rods for bedsteads.

These officers of the Central Iron & Steel Co., Harrisburg, Pa., were elected at a meeting of stockholders Oct. 5: President, Edward Bailey; General Superintendent, George Bentley; Purchasing Agent, James B. Bailey. The changes were made necessary by the death of President Charles L. Bailey and General Superintendent John N. Binnix last month.

#### The Alabama Consolidated Coal & Iron Co.

The Alabama Consolidated Coal & Iron Co. is to be incorporated in New Jersey with a capital of \$5,000,000. It will include the following companies: The Clifton Iron Furnace, Gadsden Furnace and Ore Mines, Mary Pratt Furnace, Birmingham, Gate City Ore Mines, Birmingham; and the Standard Coal Co., of Tuscaloosa Co. These fire properties own about 36,500 acres of mineral land in Alabama. Half of the proposed capital stock will be 7 per cent. cumulative preferred and the remainder common stock. The company is organized as follows: President, T. G. Bush, Anniston, Ala.; Vice-President and Treasurer, J. E. Searles of New York; General Manager, F. M. Jackson of Birmingham, Ala. The Directors, besides the officers, are: Abram S. Hewitt, Samuel Spencer of New York; J. W. Middendorf, R. H. Edmonds, Joshua Levering, of Baltimore, Md.; John Skelton Williams, Richmond, Va., and T. G. Bush, Anniston, Ala. The office is 27 William St., New York.

#### Everett Harbor Dredging.

Bids for 2,350,000 cu. yds. of dredging on the Everett harbor, Everett, Wash., are wanted until noon of Nov. 28. Address Harry Taylor, Captain, Corps of Engineers, U. S. A., Seattle, Wash.

#### Test by the Ajax Metal Co.

The Ajax Metal Co. of Philadelphia is adding to its Testing Department a fine testing machine, and in future will not only be able to make the analytical and microscopic examinations, but also physical tests, of friction, wearing and compressive qualities. It is proposed to make practical tests of bearing metals, oil and waste. These determinations will be published as they progress, using standards of all material in comparison, taking those that are largely used in the service, and those that are not, but should be. Mr. J. G. Hendrickson, the President, is somewhat familiar with the lubricating qualities of oils, having been connected with the Standard Oil Co. before taking up the metal business.

#### THE SCRAP HEAP.

##### Notes.

The Crocker homestead, at Sacramento, Cal., has been given, by the heirs of the late Charles Crocker, to the employees of the Southern Pacific for use as a hospital.



St. Louis dispatches say that the Illinois Central has subscribed \$50,000 toward the \$5,000,000 stock fund of the celebration of the centennial of the Louisiana Purchase, to be held in that city in 1903. It is said this practically insures the full subscription of \$1,000,000 from the railroads and allied interests and makes the completion of the fund certain.

At Neillsville, Wis., the advertising car of the Northern Pacific was destroyed by fire Oct. 6. The car contained specimens of mineral, cereal and fruit products and some rare animals, and the loss is estimated as \$50,000, fully insured.

It is reported that a pension fund is to be established for the employees on the Pennsylvania Lines West of Pittsburgh, to be constituted and managed like that for the lines east of Pittsburgh, which has been heretofore announced, and which will be put into effect on Jan. 1.

The freight house of the Cleveland, Cincinnati, Chicago & St. Louis at Central Ave., Cincinnati, was destroyed by fire on Sept. 30, together with a number of loaded cars. Loss, \$150,000.

The three principal roads entering Charleston, S. C., have consolidated their freight switching service in that city, and the whole of the work will be done under one management.

The machinists of the Canadian Pacific at Vancouver, B. C., went on strike on Oct. 4, and it is said that all the shopmen west of Winnipeg joined in the movement.

The State of Pennsylvania is to sue to collect a \$5,000 fine from each of a large number of the railroads which have failed to send in their annual report. These companies are both steam and street, but most of them have nothing but a name.

The Western Union Telegraph has agreed with the Railroad Commissioners of South Carolina to reduce all its 40-cent rates in that State to 25 cents. This is a compromise with the Commissioners, who had demanded that the telegraph company should pay the war revenue tax on all telegrams.

Press dispatches of Oct. 4 report the destruction by fire of snow sheds on the Central Pacific aggregating over a mile in length. The road was blocked for a whole day or more. The fires were between Cisco and Emigrant Gap, and as the telegraph wires were cut each side of the sheds it is believed that the fires were incendiary. A steel bridge 400 ft. long was damaged.

#### The Atbara River Bridge.

The men whom the Pencoed Iron Works sent to the Sudan to erect the bridge over the Atbara returned to Philadelphia last week. A gold watch has been given to each man by the company.

#### Water Works for a Mexican City.

United States Vice-Consul Neill E. Pressley, at Tampico, Mexico, has written to the State Department that there is a chance for contractors in the United States to bid upon water works and other improvements in Tampico. An estimate of the work to be done is about \$800,000 silver. The payment for the proposed improvements will be guaranteed by the State. A translation of the official advertisement asking bids was also sent to the State Department, where information can be had.

#### A Long Distance Electric Road.

The following officers were elected, Oct. 1, for the Buffalo & Erie, Dunkirk & Hickoryhurst, Fredonia & Lily Dale Electric Railroad Companies: President, C. V. Boughton; Vice-President and Treasurer, A. Schmidt; Secretary, William Hart Boughton; Attorney, Herbert P. Queal; Chief Engineer, W. A. Calhoun. General offices, 1200-1202 Prudential Building, Buffalo, N. Y. It is proposed to build an electric railroad about 90 miles long between Buffalo, Dunkirk and Erie. The B. & E., the incorporation of which was noted last week, has a capital of \$1,200,000.

#### Electric Railroad in Hawaii.

The Kohala & Hilo Ry. Co. has been organized, and a charter obtained by Herbert B. Gehr of Chicago, Ill., and others, to build an electric railroad on the island of Hawaii. The capital stock of \$3,000,000 is reported already subscribed. The projected railroad is to run from Hilo, the principal port on the eastern coast of Hawaii, to the City of Kohala, northeast, about 130 miles, connecting sugar and coffee plantations. The country to be traversed presents some serious difficulties in engineering.

A steamboat line will probably be operated from Hilo to San Francisco. Water rights have been secured by charter. Among the incorporators are: Jaudon Browne, Philadelphia; Herbert B. Gehr, Chicago; Francis M. Swanzy and Thomas Rain Walker, Honolulu; Gardner K. Wilder, Judge of the Circuit Court at Hilo, and W. C. Gardner, Honolulu, President of the Hawaiian Senate. Near Punaluu on the southern and Kukuipapa on the northern side of the island spurs of track are laid.

#### Next Year's Estimate for Naval Works.

The Navy Department has prepared estimates to be submitted to Congress for work for next year in the Navy Yards and stations. The estimates amount to \$73,045,183, an increase over the appropriations for the current year of \$24,537,187. Included in the increase for the next year is \$12,268,474 for public works and navy yards and stations. There is also an estimate of \$2,021,000 for the new Naval Academy. The item for the Navy, including armor, guns and machinery, is \$22,983,101. The estimate for the Bureau of Construction and Repair is increased over the current appropriation about \$3,000,000; for steam engineering, \$1,000,000; for pay of the Navy, about \$700,000, while the estimates for ordnance are decreased about \$700,000. The estimates for public works at the New York Navy Yard is \$1,669,000, including \$300,000 to begin the work on the new one-million-dollar granite drydock and \$300,000 to repair dock No. 2.

The items for the Boston Navy Yard aggregate \$1,498,300. For League Island, Pennsylvania, the es-

timates for new public works aggregate \$1,395,092; for Norfolk Navy Yard, \$1,349,000; for Mare Island, California, \$692,500; for Puget Sound Station, \$216,065, and for Washington, \$875,017.

#### Metropolitan Street Railway Association.

Last Saturday night the anniversary celebration of the Metropolitan Street Railway Association was held in Carnegie Hall, New York City. As was the case last year, there was a large and enthusiastic audience, and there everything indicated the continued interest of the men in this very useful institution.

#### Express Cars on Street Railroads.

The Appellate Division of the Supreme Court of New York has decided that the street surface railroads in Brooklyn and Queens can run express cars for the sole purpose of carrying freight. This decision was reached in a test case brought by Aaron A. Degrauw of Jamaica to restrain certain companies from operating express cars in the streets. Justice Hatch says that the sole question to be considered is whether the surface roads are authorized by the general railroad law to operate cars for the exclusive carriage of freight and express matter. The lower court returned an affirmative answer to that question, and Justice Hatch has no doubt of the correctness of that answer.

#### Passes in Germany.

There was a convention of journalists and authors in Zürich last summer, at which the Dresden Press Club offered a resolution to the effect that the railroads of the German Empire ought to give free passes to properly authorized delegates to such conventions. The motion of this club, it is said, was not even seconded; and it causes the Journal of the German Railroad Union to make comment to the effect that even in other countries representatives of the press are allowed to travel free, there is no occasion for German railroads to grant any such privilege which would be a lamentable violation of the uniform principle that on the State Railroads only their employees and those travelling directly in the interest of the railroads may travel free. The only exception is in favor of members of Parliamentary bodies, on political grounds. Even journeys for charitable purposes cannot be made free, though tickets at reduced rates may be had for them.

#### Unpunctuality of Long Distance Trains.

One of the Transcontinental roads which uses the term "Flyer" in connection with its principal train, has been checked up by a critical newspaper as follows: "Flyer Fails to Fly; the 'flyer' continues to be regarded as one of the jokes of the West. In August and September, both east and westbound trains were late as a rule each day, not late in minutes, but in hours, as the following will show:

"On Sept. 2 the 'flyer' was 2 hours and 50 minutes late in reaching the Pacific terminal; Sept. 3, 45 minutes; Sept. 6, 13 hours, 45 minutes; Sept. 8, 4 hours, 30 minutes; Sept. 10, 14 hours, 45 minutes; Sept. 11, 1 hour; Sept. 13, 9 hours; Sept. 14, 5 hours; Sept. 15, 12 hours, 20 minutes; Sept. 16, 20 minutes; Sept. 17, 1 hour; Sept. 18, 20 minutes; Sept. 20, 1 hour, 15 minutes; Sept. 22, 25 hours, 40 minutes; Sept. 23, 2 hours, 30 minutes; Sept. 24, 7 hours, 10 minutes; Sept. 26, 3 hours, 15 minutes; Sept. 27, 13 hours, 5 minutes; Sept. 28, 4 hours, 45 minutes.

"Coming east the 'flyer' came in on Sept. 1, 1 hour late; Sept. 2, 45 minutes; Sept. 3, 1 hour, 10 minutes; Sept. 4, 45 minutes; Sept. 6, 45 minutes; Sept. 7, 2 hours; Sept. 8, 6 hours; Sept. 9, 1 hour, 30 minutes; Sept. 10, 20 minutes; Sept. 13, 12 hours, 30 minutes; Sept. 14, 2 hours, 45 minutes; Sept. 15, 4 hours; Sept. 16, 1 hour, 15 minutes; Sept. 17, 1 hour, 20 minutes; Sept. 19, 45 minutes; Sept. 20, 40 minutes; Sept. 22, 1 hour; Sept. 23, 5 hours, 10 minutes; Sept. 25, 20 minutes; Sept. 26, 45 minutes; Sept. 27, 2 hours; Sept. 28, 5 hours, 25 minutes; Sept. 29, 9 hours."

#### Needed on Some Other Roads.

Because of complaints from women passengers, the following order has been issued by General Superintendent Potter of the Long Island Railroad: "All employees in addressing a woman must use the term 'Madam,' avoiding term 'Lady,' which is objectionable. Employees must not take hold of a passenger, except where it is necessary to avoid accident or to care for small children or an elderly person in need of assistance."

#### New York Commerce Convention.

The State Commerce Convention, a gathering of delegates from Boards of Trade and similar bodies, met in Utica, N. Y., Oct. 10. The permanent Chairman of the meeting was Mr. John D. Kernan, formerly State Railroad Commissioner. The first address was by Mr. David McClure, on the "Preservation of the Forests." Mr. McClure was the author of the constitutional amendment forbidding the sale or lease of State forest lands. He recommended the appointment by the State of a single forest commissioner. Mr. Kernan delivered an address on the canal, telling how the lower cost of transportation by railroad was taking away about all the business of the Erie Canal. To abolish tolls on boats is ineffective, as long as the terminal charges on grain are unreasonably high. The canal must be deepened if it is to be continued as a competitor, but even 14 ft. depth will be useless without lower charges at Buffalo and New York. Erastus Wiman spoke of the need of terminals at New York. The State should compel the city to give the canal boats five or six piers, where flour could be stored free for 10 days. New York is now the paradise of truckmen.

John I. Platt, editor of the Poughkeepsie Eagle, read a paper arguing that the canals are antiquated and useless, and should be abandoned. In 1897 the total quantity of freight carried on the canals was 3,617,804 tons, while the amount of taxes paid for the support of the canal, exclusive of the \$9,000,000 improvement, was \$2,571,169, so that counting this, which is a part of the real cost of transportation, the State contributed over 2 cents on every bushel of wheat carried and about the same on every bushel of corn. Add to this the prevailing rate charged by the boats, from 2.5 cents to 3 cents, we have an actual rate higher than the highest rate charged by the railroads. The New York Central and the Erie roads paid taxes in that year aggregating about \$300,000 more than the sum above named, and carried 11 tons of grain where the canal carried one ton. Mr. George B. Sloan discussed plans for improving the canal, and Mr. Martin Schenck, ex-State Engineer, advocated a canal large enough to admit small barges.

#### Prizes for Alertness.

Engineman John Hagerty, of the Baltimore & Ohio has a gold watch, given to him by the company a few weeks ago. Hagerty was oiling his engine at Connellsville, while waiting for the passengers to

alight, when he heard another train coming behind and believed that it was not under proper control. He sprang into his cab, opened the throttle and started his train. The other engine struck the rear car, but it was not a hard blow, and Hagerty's promptness no doubt saved lives as well as property. The company at once ordered for him a handsome gold watch, suitably inscribed, and a gold chain, as a reward for his devotion to duty and "using his brains" in time of emergency. Not long ago a brakeman on the Baltimore & Ohio saved a passenger train from running into two derailed cars. The company sent him a check for \$50 and posted a bulletin complimenting him for his quickness of thought.

#### Lake Notes.

It is reported from Cleveland that Eddy Bros. of Bay City, Mich., have let contract to the American Shipbuilding Co. for two steel freight steamers. These vessels will be about 435 ft. long, 50 ft. beam, with a capacity of 6,000 tons each, and the two will cost about \$640,000. They are to be delivered in April next.

#### Track Tanks on the Baltimore & Ohio.

It is announced that the Baltimore & Ohio, which has track tanks all along its line between Philadelphia and Washington, is to have them also throughout the main line; and the 50 new compound locomotives recently ordered from the Baldwin Locomotive Works for freight service are to have water scoops.

#### Cars for South America.

Manufacturers in Birmingham, England, and thereabouts have recently received orders from the Argentine Republic for freight cars to the value of over \$1,250,000.

#### An English Landslide.

In the Leire cutting, on the Leicester & Rugby Branch of the Midland Railway of England, recently, there was a great landslide at a place where there had been no trouble since the line was built, 59 years ago. The cut is about 70 ft. deep. It appears that the bank on one side not long ago gave signs of shifting, and it was closely watched, but there was suddenly developed a slide over 330 ft. long and of a depth equal to the depth of the cut. Several hundred men were required night and day to keep open a cut wide enough for one track.

#### Is a Bicycle Baggage.

The London Daily News of a recent date contained the following paragraph: "Is a bicycle passenger's luggage? The question arose in one of the county courts yesterday on a claim brought by a passenger against a railway company, who had sent his bicycle, not in the same train with him, but a day afterward. The Judge decided the case in favor of the company. A bicycle, he said, could not be treated as passenger's luggage. The company had a right to send it as goods within a reasonable time, and as it came to hand in twenty-four hours, he held that was reasonable time."

#### Iron and Steel Export Exhibits.

The iron and steel and machinery exhibits at the National Export Exposition at Philadelphia, in the main hall, occupy more than half the floor space which is nearly 114,000 sq. ft. Among the leading exhibitors are the A. & P. Roberts Co., Pencoed Iron Works, Philadelphia, structural material; Phoenix Bridge Co., Phoenixville, Pa., structural material; Glasgow Iron Co., Pottstown, Pa., plates and shapes; Illinois Steel Co., rails and plates; R. D. Wood & Co., Philadelphia, Pa., cast iron pipe, etc.; Howe, Brown & Co., Pittsburgh, Pa., crucible steel; Taylor Iron & Steel Co., High Bridge, N. J., manganese steel castings, projectiles; Wm. Wharton, Jr., & Co., Philadelphia, Pa., switches, frogs, etc.; Oliver Iron & Steel Co., Pittsburgh, Pa., picks, mattocks, etc.; Reading Iron Co., Pittsburgh, Pa., iron tubing and shapes; Hoopes & Townsend, Philadelphia, Pa., bolts, nuts, etc.; Crescent Steel Co., Pittsburgh, tool steel and tools; American Iron & Steel Mfg. Co., Lebanon, Pa., bolts, nuts, etc.; Pratt & Letchworth Co., Buffalo, N. Y., malleable iron castings; John A. Roebling's Sons Co., Trenton, N. J., wire rope, etc.; Alan Wood Co., Philadelphia, sheet iron and steel; Hartman Mfg. Co., Ellwood City, Pa., wire fencing and wire goods.

#### Changes in Stations of Engineer Officers.

The following changes are announced in stations of officers of the Engineer Corps of the Army in charge of river and harbor work: Major H. M. Adams, from New York to New Orleans; Major J. B. Quinn, from New Orleans to Norfolk; Major T. L. Casey, from Norfolk to Vicksburg; Major J. H. Willard, from Vicksburg to Chicago; Major W. L. Marshall, from Chicago to New York.

#### Fire Protection in Chicago.

Plans are being prepared by City Engineer Ericson for a high-pressure water system in the downtown streets within three-fourths of a mile of the Chicago River. This system will have 8 in. and 12 in. pipe leading from the river through all main streets on both sides of the river with branch connections in side streets. Fire tugs on the river can then force water through these pipes at 260 to 300 lbs. pressure, which will be available directly from the hydrants without the use of steam fire engines which can then be used on the ordinary mains.

#### Carnegie Steel Company Improvements.

The Carnegie Steel Co., Ltd., have announced that work will soon be begun on extensions and improvements to cost about \$8,000,000. Two blast furnaces of 700 tons capacity each will be built at Rankin, Pa. Across the Monongahela River from Rankin to Homestead a steel bridge will be constructed to be used solely for conveying hot metal from the new Carrie furnaces to the Homestead Steel Works. In Duquesne 15 50-ton basic open-hearth furnaces are to be installed, and a reversible blooming mill will be built. The product of the Duquesne furnaces and blooming mill will be billets and sheet bars for the trade.

The stacks of the new furnaces at Rankin will be 106 ft. high, with a diameter of 23 ft. The building of these two furnaces will give Allegheny County a total of 32 stacks, with an aggregate capacity of 3,850,000 gross tons, of which the Carnegie Company will own 19, with a total capacity of 2,700,000 gross tons, or about 70 per cent. of the entire producing capacity of Allegheny County.

The entire whaleback fleet of the American Steel Barge Co. has been sold to the Oliver Iron Mining Co., an allied company of the Carnegie Steel Co. The fleet includes 10 steamers and 20 schooners, and



the acquisition of the property will give the Carnegie interests a fleet of 16 steamers and 20 schooners. The amount paid is said to be \$3,000,000.

#### Technical Schools.

**Lehigh University.**—The celebration of Founder's Day at Lehigh University took place Thursday, Oct. 12, in the Packer Memorial Church. An address was delivered by Dr. Austin Scott, President of Rutgers College.

**University of Chicago.**—The thirtieth convocation of the University was held at Central Music Hall, Oct. 2, the address being delivered by the Right Reverend John L. Spalding, on "The University and the Teacher." Dr. W. H. Harper, President of the University, made a report on the condition of its affairs, which showed that the attendance for the summer quarter just closed was 1,651, the largest in the history of the University. Twenty-three prizes and honors and 47 degrees and certificates were awarded. The autumn quarter began Oct. 3, with 911 students registered on the first day.

**Stevens Institute of Technology.**—The Alumni Association of Stevens Institute will present to Mr. Andrew Carnegie, in return for his gift of \$50,000 for a new building, a piece of the first T rail ever made. Referring to the matter, President Morton stated that this souvenir will be invaluable as a relic, because the T rail was invented by Robert L. Stevens, one of the Stevens family who founded the Institute. The rail in question was made in Wales at the mills of Sir William Guest, and has been carefully preserved. The piece of rail will be appropriately inscribed and will be accompanied with documents establishing its authenticity.

**University of Illinois.**—A number of new courses in the Department of Electrical Engineering have been added, among which are courses in electro-metallurgy, alternating current working and polyphase testing. The equipment of the electrical engineering laboratory is being increased for regular and advanced work in these branches, and the announcement which has been made giving the particulars of the courses in electrical engineering shows that Prof. Aldrich in his new position has strengthened the electrical department. The degree of electrical engineer is given only after the completion of five years of work; the fifth year is devoted entirely to special work. The principal or primary subjects are elected from the advanced electrical engineering course. The secondary or subordinate subjects are elected from the advanced courses in mathematics, physics, chemistry and mechanical engineering.

#### LOCOMOTIVE BUILDING.

The Baldwin Locomotive Works are building four engines for the Mexican National.

We are informed that the New York, New Haven & Hartford has ordered 30 locomotives.

The Baldwin Locomotive Works have received an order for one engine from the Hilo Railroad of Hawaii.

The Cooke Locomotive & Machine Works are building one locomotive for the New York, Ontario & Western.

The Omaha, Kansas City & Eastern has ordered two consolidation locomotives from the Baldwin Locomotive Works.

We are informed that the Chicago, Milwaukee & St. Paul has ordered about 16 locomotives from the Baldwin Locomotive Works.

The Dominion Iron & Steel Co., of Sidney, N. S., has placed an order for one locomotive with the Pittsburgh Locomotive & Car Works.

The Davenport, Rock Island & Northern, a new belt road at Davenport, Ia., is reported wanting some rolling stock. H. B. Schuler is President.

The Delaware, Lackawanna & Western has ordered from the Brooks Locomotive Works 20 locomotives instead of 16, as stated Sept. 29. The same road has also ordered 10 engines from the Dickson Locomotive Works.

The order for 16 10-wheel freight locomotives for the Chicago, Rock Island & Pacific, noted in our issue of last week, was let Oct. 5 to the Baldwin Locomotive Works. These locomotives will be four-cylinder compounds, with cylinders equivalent to 20 in. x 28 in. cylinders of simple engines.

The Richmond Locomotive & Machine Works have received an order from the Rio Grande Western for four consolidation locomotives. They are for May, 1900, delivery. They will weigh 181,000 lbs. with 164,000 lbs. on drivers; they will have 22 in. x 28 in. cylinders; drivers 50 in. in diam., straight top boilers, with a working steam pressure of 185 lbs., containing 340 tubes 13 ft. long and 2 in. outside diam.; fireboxes 120 in. long and 41½ in. wide; tank capacity for water, 4,500 gals.

The Atchison, Topeka & Santa Fe has ordered 70 consolidation engines, 20 from the Richmond Locomotive & Machine Works and 50 from the Baldwin Locomotive Works. Those being built by the Richmond Locomotive Works are for January and February delivery. They will weigh 168,000 lbs. with 150,000 lbs. on drivers. They will have 21 x 30 in. cylinders, drivers 57 in. in diam., extended wagon top boilers containing 281 tubes 13 ft. 10 in. long, with 2 in. outside diam., working steam pressure of 180 lbs., fireboxes 108 in. long, 40 in. wide and tank capacity for water 6,000 gals. Those ordered from the Baldwin Locomotive Works are for March, April and later delivery.

#### CAR BUILDING.

The Intercolonial will build 50 to 100 box cars at its own shops.

The Dominion Iron & Steel Co., of Sidney, N. S., will order some freight cars.

The Fitchburg will build at its own shops, during November, 128 furniture cars.

The Pittsburgh & Lake Erie is getting bids on 10 coaches and two passenger cars.

The Delaware & Hudson Canal Co. is in the market for 25 cars for passenger service.

The Southern Car & Foundry Co. has received an order from the Tennessee Central for 55 cars.

The Chicago, Milwaukee & St. Paul has issued specifications for 49 cars for passenger service.

The Harlan & Hollingsworth Co. is building two passenger cars for the Great Falls & Canada.

We are reliably informed that the Southern Pacific will soon order 1,000 more box cars, just like the last.

The Lehigh Valley is in the market for 12 passenger cars, and we understand the same road will buy 5,000 freight cars.

The Hilo Railroad of Hawaii has ordered 40 cars from the American Car & Foundry Co. They will be built at the St. Charles shops.

It is reported that the Davenport, Rock Island & Northern, a new belt road at Davenport, will want some rolling stock. H. B. Schuler is President.

We are informed that the Atchison, Topeka & Santa Fe will build between six and eight hundred freight cars of all kinds at its own shops before Jan. 1.

The cars ordered by the Rock Island & Peoria from the American Car & Foundry Co., as noted last week, are to be coal cars 33 ft. long and to weigh 29,000 lbs., with a capacity of 60,000 lbs. They will be delivered Nov. 10.

The passenger cars for the Illinois Central, noted Sept. 29, were ordered Oct. 5. Pullman's Palace Car Co. will build 27 and Barney & Smith 11, making 38 in all, which number including coaches, dining and chair cars and baggage cars.

It is reported that the New York, New Haven & Hartford will order 50 passenger cars; 10 or 20 baggage cars; and 10 parlor cars. We have no official information, but no doubt there is some truth in the report, as we some time ago noted that the road would order new passenger equipment.

On Oct. 5 the Duluth & Iron Range placed an order with the Pressed Steel Car Co. for the 350 steel cars first noted in our issue of Sept. 8. We understand that these cars are to be of 100,000 lbs. capacity and similar to those ordered at the same time by the Chicago, Lake Shore & Eastern, and noted elsewhere.

The 250 steel flat cars ordered by the New York Central & Hudson River from the Pressed Steel Car Co., as stated last week, are for March, 1900, delivery. They will be of 80,000 lbs. capacity, 40 ft. long and 9 ft. wide and have National hollow brake beams, Lappin brake shoes, Magnus Metal Co.'s brasses, Gould couplers, McCord journal boxes and journal box lids and Fox trucks.

The 500 gondola cars ordered by the Lake Shore & Michigan Southern from the American Car & Foundry Co., as noted last week, are for November and December delivery. They will be of 80,000 lbs. capacity, 35 ft. long, and will weigh 36,000 lbs. The equipment specified includes Schoen bolsters, National Hollow brake beams, Westinghouse air brakes, Gould couplers and Harrison dust guards.

Bids for the 1,000 steel coke cars for the Chicago, Lake Shore & Eastern, mentioned in our recent issues, were received Oct. 2, and contract was let Oct. 5 to the Pressed Steel Car Co. These will be side dump cars, made especially for coke, and are for December and January delivery. They will be of 80,000 lbs. capacity, 40 ft. long over end sills, 9 ft. 5 in. wide, 12 ft. 5½ in. high from top of rail, and will weigh about 34,000 lbs. The axles will be made by the Illinois Steel Co., and the special equipment specified includes Kewanee brake beams, New York air brakes, Tower couplers, Miner draft rigging, French springs, Fox trucks, Universal brasses, M. C. B. brake shoes and cast-iron wheels and journal boxes.

In recent issues we have noted that the Chicago, Rock Island & Pacific would build new freight cars at its Horton, Kan., shops. We are now officially informed that 500 box, 200 stock and 400 coal cars will be built, all of 60,000 lbs. capacity. The box cars will be 34 ft. long, 8 ft. 6 in. wide and 6 ft. 6½ in. high; the stock cars, 36 ft. 6 in. long, 9 ft. 4½ in. wide and 7 ft. ¼ in. high; and the coal cars, 36 ft. long, 8 ft. 6 in. wide and 6 ft. high. The equipment will include C. R. I. & P. trucks, with Schoen bolsters and cast steel body bolsters made by the American Steel Foundry Co., of St. Louis, Westinghouse air brakes, Janney couplers, C. R. I. & P. and Miner draft rigging, Scott springs, chilled cast-iron wheels, C. R. I. & P. brasses and paint, and Dunham doors on the box cars.

#### BRIDGE BUILDING.

**BALTIMORE, MD.**—The City Commissioner estimate for repairs to bridges for next year is \$25,000.

**BELLFONTE, PA.**—The Borough Engineer will prepare plans and specifications for the proposed bridge over Logan Branch, near Reynolds' Mill.

**BEN AVON, PA.**—The United Traction Co., Pittsburgh, Pa., proposes to build an extension to Emsworth. This will necessitate a steel bridge about 600 ft. long at Spruce Run. Other bridges will be necessary at Lowries Run, in Emsworth, and also in Ben Avon.

**CHICAGO, ILL.**—City Engineer Ericson has prepared a report on the new bridges needed and estimates that \$5,498,700 is necessary for new bridges and repairs to old ones. The sum of \$3,110,000 is asked for replacing bridges which have been closed to the public already or are beyond repair. The list of new bridges needed is as follows:

	Estimated cost.
Randolph st., double roadway.....	\$175,000
Dearborn st., double roadway.....	175,000
Washington st., single roadway.....	100,000
Polk st., single roadway.....	100,000
22d st., double roadway.....	210,000
Main st., double roadway.....	175,000
Western ave., single roadway.....	100,000
Fuller st., single roadway.....	100,000
Archer st., double roadway.....	175,000
Kinzie st., double roadway, double deck.....	225,000
Erie st., double roadway.....	175,000
Indiana st., double roadway.....	175,000
Chicago ave., double roadway.....	175,000
Division st. (north branch), double roadway.....	200,000
Division st. (canal), double roadway.....	200,000
Weed st. (canal), single roadway.....	100,000
North ave., double roadway.....	200,000
Clybourn pl., double roadway.....	175,000
95th st., double roadway.....	175,000

In addition \$400,000 is asked for proposed new bridges as follows:

California ave. (west fork, south branch, swing bridge), estimated cost, \$100,000.  
Carpenter st. (north branch), single roadway, new bascule, \$150,000.  
Blackhawk st., bascule, \$150,000.

New viaducts are proposed to be built as follows:

Extension of Polk st. viaduct and approach, \$45,000.  
Extension of Taylor st. and approach, \$75,000.  
Kinzie st. extension to Milwaukee Avenue viaduct, \$465,000.

It is not expected that the entire sum will be recommended by the Finance Committee. Allowing that the railroads will pay for repairs of viaducts over their tracks, the city must spend nearly \$4,500,000 for new bridges and repairs. The Division St. bridge was closed Oct. 6, making the fourth bridge over the North Branch now closed to traffic, the others being at Clybourn Place, Wood St. and Webster Ave. A number of others are in almost as bad condition. While the City Council has authorized an expenditure of \$10,000 for plans for new bridges it will be some months before they can be prepared.

**BOISE, IDA.**—Two spans of the bridge across Snake River fell Sept. 30. One of the spans was 250 ft. and the other 170 ft. long. The bridge was 800 ft. long and contained seven spans. It cost \$30,000.

**BRADFORD, PA.**—The McKean County Court has appointed viewers for the bridge over the Allegheny River in Liberty Township. C. L. Colgrove, Surveyor.

**CLEVELAND, O.**—Bids are asked by the Director of Public Works until Oct. 26, for rebuilding the superstructure of the Willson Ave. bridge. Address James T. Pardee, Bridge Engineer, 311 City Hall. The rebuilding of the Jefferson St. or Upper Seneca St. bridge will not be done until next year.

The King Bridge Co. has the contract for the superstructure of the Center St. bridge at \$56,674, this being about \$20,000 higher in price than proposals received last January.

Several bridge contracts awarded by the old Board of County Commissioners before going out of office may be declared illegal and new contracts be made.

**CORNWALL, ONT.**—C. E. Fowler, 11 Broadway, New York City, is preparing erecting plans for the new Cornwall bridge for the New York & Ottawa Ry. Co. The falsework will be very heavy and the traveler will be a three bent one, 75 ft. high.

**EVERETT, WASH.**—The Snohomish County Commissioners will receive bids for building a bridge on Lake Stevens Road. T. E. Headlee, Co. Clerk.

**FREEMAN'S POINT, ME.**—The Boston & Maine, we are informed, has no intention of building a bridge, as reported, across the Piscataqua River.

**GALVESTON, TEX.**—Surveyor Sias, of Galveston County, recommends that the Bay bridge be repaired.

**HAZELTON, PA.**—An ordinance has been introduced in the Council authorizing the Lehigh Valley RR. to build an overhead bridge on Vine St. between Hawthorne and Alder Sts.

**INDIANAPOLIS, IND.**—Bids are wanted, according to report, by the Board of County Commissioners until Oct. 13, for the superstructure for 18 small bridges in the county.

All bids received Sept. 27 for the bridges at Illinois and Meridian Sts., over Fall Creek, were rejected and new bids are wanted. Address B. J. T. Jeup, City Engineer. (Sept. 22, p. 665.)

**JOHNSTOWN, PA.**—A hearing was given last week by the Railroad Commissioners for a bridge over the railroad tracks at West Main St. W. W. Crouse, City Clerk.

**LA CROSSE, WIS.**—La Crosse County has sold \$5,000 of road and bridge bonds.

**LAFAYETTE, IND.**—The plant of the Lafayette Bridge Company was entirely destroyed by fire with many of the company's drawings, Oct. 6. The loss is estimated at about \$70,000, on which there is \$21,000 insurance, distributed among a number of companies.

**LA RIVIERE, MAN.**—A steel bridge will be erected over the Pembina River, to cost about \$3,000. Another steel bridge will be built over the same river 20 miles south.

**LEEDS, ALA.**—It is proposed to build an iron bridge across the Cahaba River, near the water works.

**MALVERN, ARK.**—The Hot Springs County Levy Court has appropriated \$10,000 to build a bridge across the Ouachita River, at some point to be selected by Commissioners J. M. Caldwell and D. S. McCray of Malvern, and William Lambert of Bismarck.

**MAUMEE, O.**—Bids will not be wanted until next spring, according to report, for the proposed four-track bridge to be built by the Lake Shore & Michigan Southern at Maumee, which is to cost about \$50,000.

**MIAMISBURG, O.**—A. G. Feight, Dayton, O., Auditor of Montgomery County, will receive proposals until noon of Oct. 28 for labor and material necessary for building a bridge across Sycamore St., on the extension of Sixth St., in Miamisburg. Each bidder for superstructure must deposit a check for \$1,000. A check for \$500 must be sent with bids on foundations and masonry.

**MONTCLAIR, N. J.**—The Erie RR. has submitted plans to the Town Council for removal of grade crossings at Park St., Watchburg Ave. and on Valley Road, in Watchburg. Two bridges are necessary.

**MT. VERNON, N. Y.**—The Wrought Iron Bridge Co. has prepared plans and specifications for the bridges proposed between the city of Mt. Vernon and the town of Pelham, across the Hutchinson River, at East Lincoln Ave., East Third St., East Sixth St. and South Fulton Ave. When estimates are prepared bids will be asked on the work.

Plans are in consideration to abolish the grade crossing at Mt. Vernon Ave., on the New York & Harlem RR. The steam railroad will be asked to lower its tracks for a distance of 4,000 ft. The Union (Street) Ry. Co. offers to give \$20,000 toward the improvement. John F. Fairchild is Engineer for the Union Ry. Co.



**NATCHITOCHES, LA.**—It has been voted to tax Ward One for building the proposed wagon and railroad bridge across the Red River at Grand Ecure, about four miles below the city. (July 7, p. 497.)

**NEW YORK, N. Y.**—Bridge Commissioner John L. Shea has asked the Board of Estimate and Apportionment for \$632,062 for bridge work next year. This is an increase of \$224,540 over that of last year, partly due to the change in labor laws.

**OAKLAND, CAL.**—The California Bridge & Construction Co. will build the bridge over the tidal canal at High St., Oakland, its bid being \$26,000. The structure will be a single draw span of steel and concrete.

**ORLANDO, FLA.**—The Lake Region, Manatee River & Gulf RR., now building, will require a bridge across the Withlacoochee River, and a drawbridge across the Manatee River, in Florida. Wm. B. Tucker, of Orlando, is President and General Manager.

**ORONO, ME.**—The Maine Central, according to report, will put up a new iron bridge across the stream at Orono, replacing the present structure.

**OTTAWA, ONT.**—Steps are being taken to induce the City Council to construct a steel bridge at Somerset St., as recommended by the City Engineer.

**PHILADELPHIA, PA.**—The Bureau of Surveys estimates that \$500,000 are wanted for bridge work next year.

A resolution has been introduced in the Common Council authorizing the Director of Public Works to grade and build a bridge on Rhawn St.

A measure was introduced in the Common Council Oct. 5 to build bridges on the line of Tabor Road or Olney Ave. for the road to go under the North Penn and Tabor branches of the Philadelphia & Reading.

**RANKIN, PA.**—The Carnegie Steel Co., Ltd., will build a new bridge across the Monongahela River to Homestead.

**SACRAMENTO, CAL.**—Major W. H. Heuer, Corps of Engineers, U. S. A., has notified the County Board of Supervisors regarding a bridge site at Georgiana Slough. This bridge will be a steel drawbridge to connect Andrus Island with the mainland, and has been in consideration for several years. The County Board have accepted the plans and location as suggested by Major Heuer.

**ST. LOUIS, MO.**—The Board of U. S. Engineers appointed to report upon the proposed bridge across the Mississippi River at St. Louis recommend a 700-ft. clear span. (July 21, p. 529.)

**ST. PAUL, NEB.**—Bids are asked until Oct. 17 for a bridge over Oak Creek. Frank Palansky, Auditor of Howard County, may be addressed.

**SEATTLE, WASH.**—A bridge to be built on a new road to Magnolia Bluff will cost about \$2,000. The county officers will soon want bids.

**SPOKANE, WASH.**—M. Toltz, Engineer of Bridges for the Great Northern Ry., is reported as stating that it is the intention of the G. N. to replace all wooden bridge and trestles in the Cascade Mountains with steel structures, the work to begin early next spring. Five bridges will be necessary within the corporate limits of this city. The largest of these will be 165 ft. high and will cost \$125,000.

**TOPEKA, KAN.**—Plans are again in consideration for a bridge to cost about \$10,000 across the Kansas River, three miles above this place.

**TUSCUMBIA, ALA.**—The Board of Commissioners of Colbert County has ordered an iron bridge to cost \$1,700 across Spring Creek, one and a half miles from Tusculmia.

**WASHINGTON, D. C.**—It is proposed to build a bridge over Rock Creek at Gay or N St. or Dumbarton Ave.

**WAYCROSS, GA.**—The Ware County Commissioners have decided to build a bridge 10 ft. in width across Big Creek, near the Pierce County line. It will be 375 ft. long.

**WINDSOR, CONN.**—The Railroad Commissioners have ordered that the tracks of the New York, New Haven & Hartford be raised about 250 ft. north of the present crossing.

**YANKTON, S. D.**—J. S. Mecklin, of Chicago, Ill., and W. W. Graham, of Norwalk, O., promoters of the Yankton, Norfolk & Southern RR., have secured from the Secretary of War the privilege formerly held by the Dakota Southern RR. to build a bridge across the Missouri River at Yankton.

#### Other Structures.

**ATLANTIC CITY, N. J.**—Reports state that it is proposed to rebuild and extend the piers at Atlantic City.

**BIRMINGHAM, ALA.**—The car barn and shops of the Birmingham Ry. & Electric Co., destroyed by fire Sept. 24, will be rebuilt. The loss by this fire is placed at \$60,000.

**CHAMPAIGN, ILL.**—The Champaign & Urbana water works have been bought by F. H. Amsberry and William Prettyman. It is said that during the ensuing year the new owners will spend over \$50,000 in improving the plant, which will be managed by Mr. Amsberry.

**CHICAGO, ILL.**—The Western Electric Co. is about to begin work on several new buildings at its present plant, to cost about \$150,000, and it is reported that this company is also considering a new malleable iron foundry.

**CLEVELAND, O.**—Reports state that the Wheeling & Lake Erie has plans decided upon for a new local depot.

**COOPER, TEX.**—The Delta County Commissioners have decided to issue \$35,000 of bonds for a new court house.

**CRISFIELD, MD.**—Reports state that the Pennsylvania RR. will improve the docking facilities at this place, formerly owned by the Baltimore, Chesapeake & Atlantic Ry. An iron depot and pier will replace the present wooden structure.

**DUBUQUE, IA.**—Bids are wanted by James Knox Taylor, Supervising Architect, Treasury Dept.,

Washington, D. C., until Oct. 30, for construction (except heating apparatus, electric wiring and conduits) of the addition to the United States Custom House and Post Office building at Dubuque.

**FORT WAYNE, IND.**—W. Meyer, Jr., City Auditor, will soon place an issue of \$200,000 court house bonds.

**GROVE CITY, PA.**—The Bessemer Gas Engine Co. recently increased its capital to \$200,000, and will build new buildings.

**HILLSBORO, N. C.**—The Southern Ry., according to report, proposes to build a new depot in this place.

**HOBOKEN, N. J.**—Plans are being prepared for a new office and freight building for the Lackawanna RR., on Ferry St., north of the tracks, on the site of the present freight sheds. It will be 500 ft. long, 40 ft. wide and two stories in height.

**LONG ISLAND CITY, N. Y.**—A. Van Horn Ellis has filed plans with the Bureau of Building of the Borough of Queens for four large factory buildings at Astoria, to cost \$304,700, to be used to make iron and steel products. These buildings will be 197 x 200 ft., 100 x 22 ft., 57 x 27 ft., and 125 x 80 ft., respectively. They will be iron truss roof structures, between 50 and 60 ft. each in height.

**McKEES ROCKS, PA.**—The Pennsylvania Malleable Co. will build its proposed plant in this place. A contract for the main building has been let to the Pittsburgh Bridge Co. for the steel. The building will be 640 x 220 ft.

**MUSKEGON, MICH.**—The Standard Malleable Co. will build a new building to accommodate the increase in business.

**NEW YORK, N. Y.**—The Manhattan Storage Co. will build a ten-story storage warehouse at Fifty-second St. and Seventh Ave., after the plans of J. E. Ware & Son. The estimated cost is \$200,000. The building will be 100 x 100.5 ft.

The French Church of St. Esprit will build a new two-story church at 45 and 47 E. 23d St., to cost about \$50,000. Bruin & Hauser are the architects.

A ten-story building will be built at 3, 5 and 7 W. 22d St., by James McCutcheon, to cost about \$150,000. James B. Baker is the architect.

Senator Timothy D. Sullivan, it is stated, will build a new theater on property recently purchased at 109 and 111 W. 33d St., and running through to 112 W. 34th St. The theater will be of brick and iron and five stories in height.

The Police Department will soon receive bids for building five new station-houses, authorized recently by the Board of Estimate. The total cost will be \$475,000.

Wm. Prescott will build an eight-story brick and stone fire-proof office building at 36 E. 22d St., for which Mr. George W. Spitzer prepared the plans. The building will be 27 x 100 ft.

A three-story stable, to cost \$20,000, will be built at 322-324-326 E. 103d St. for the Mutual Milk Co. Messrs. B. & J. Walther are the architects.

The contract to extend building No. 33 in the Brooklyn Navy Yard has been awarded to W. J. Triest at \$47,000. The extension will provide quarters for the Paymaster's office.

**OYSTER BAY (L. I.), N. Y.**—It has been voted to build a new school house in Kellogg St., to cost about \$25,000.

**PEORIA, ILL.**—Reports state that the Chicago, Rock Island & Pacific will rebuild the shops in Peoria.

**PHILADELPHIA, PA.**—The Union Traction Co. will build a new storage battery station at the corner of Fifth and Lombard Sts. The structure will be of brick and terra cotta, of iron framework and two stories in height.

Horace Trumbauer, Land, Title & Trust Bldg., Philadelphia, is preparing plans for a large hotel to be built at Atlantic City, N. J., according to report, for Thomas Green of 3601 Chestnut St., Philadelphia. The structure will be of brick and stone and have a steel framework.

**PITTSBURGH, PA.**—The Pittsburgh Valve & Machine Co., now located in Allegheny, will move its plant to Pittsburgh, where larger works will be built.

The Baker's Machine Co., recently incorporated, will build a plant in Pittsburgh. Clare G. Tucker and R. D. Elwood are interested.

The Pittsburgh Brass Co. proposes to build a factory to make brass articles. Harry Ward and Jos. S. Brown are interested.

D. H. Burnham & Co. have let the contract for the passenger station for the Pennsylvania System at this place, according to report, for which they are the architects. It is stated that \$2,000,000 will be spent on the structure.

**ST. LOUIS, MO.**—Reports state that a building permit has been issued to the Walker estate for a six-story warehouse, to cost about \$35,350, on the north side of Washington Ave., between 18th and 19th Sts. It will be 50 x 135 ft.

The St. Louis Brewing Association will make alterations in its stock house at Papin St., to cost about \$80,000.

**SALINAS, CAL.**—The Southern Pacific, according to report, proposes to build round houses and a machine shop at this place.

**SCRANTON, PA.**—Reports state that plans are being prepared for a new Y. M. C. A. building in Scranton, which will cost about \$200,000.

**SHEFFIELD, ALA.**—The Southern Ry., according to report, has been granted a concession by the city for the proposed new station on First St. The building will be of brick with a stone front, 40 ft. wide and 200 ft. deep. Bids are wanted.

**TACOMA, WASH.**—The Northern Pacific RR. Co., according to report, has completed plans for new docks at Tacoma. The proposed improvements will require considerable dredging.

**TUPELO, MISS.**—The Mobile & Ohio will build a new passenger station here, for which bids are wanted.

**WILKENSBURG, PA.**—The contract for the new plant of the Pittsburgh Auto-Car Co. at Wilkensburg, has been given to Messrs. Lytle Bros., of Wilkensburg. The works will be of brick, steel and wood. The main building is to be 200 x 50 ft., with a blacksmith shop 30 x 50 ft., two stories high, and a loading shop 60 x 15 ft., two stories high. The plans were prepared by Mr. Armin Schotte, of Pittsburgh,

#### MEETINGS AND ANNOUNCEMENTS.

##### Dividends.

Berkshire.—Quarterly, 1½ per cent., payable Oct. 15.  
Choctaw, Oklahoma & Gulf.—Semi-annual, preferred, 2½ per cent.; common, 2 per cent., both payable Oct. 31.

Great Northern.—Quarterly, preferred, 1½ per cent., payable Nov. 1.

Cleveland City.—Quarterly, 1 per cent., payable Oct. 10.

Louisville Ry.—Semi-annual, preferred, 2½ per cent. Metropolitan St. (San Francisco).—Quarterly, 60 cents per share, payable Oct. 10.

Metropolitan St. (N. Y.).—Quarterly, 1½ per cent., payable Oct. 16.

North Chicago.—Quarterly, 3 per cent., payable Oct. 15.

Pittsburgh & Birmingham Traction.—One and a half per cent., payable Oct. 18.

Meetings and conventions of railroad associations and technical societies will be held at follows:

American Association of General Passenger and Ticket Agents.—The annual convention will be held at Boston, Mass., Oct. 17.

American Society of Civil Engineers.—Meets at the house of the Society, 220 West Fifty-seventh street, New York, on the first and third Wednesdays in each month, at 8 p. m.

American Street Railway Association and Street Railway Accountants' Association of America.—The annual convention is set for Oct. 17, at Chicago, Ill. T. C. Pennington, Secretary, 2020 State St., Chicago.

Association of Engineers of Virginia.—Holds its formal meetings on the third Wednesday of each month from September to May, inclusive, at 710 Terry Building, Roanoke, at 5 p. m.

Association of Railway Superintendents of Bridges & Buildings.—The annual convention will be held Oct. 17, in Detroit, Mich. S. F. Patterson, Secretary, Concord, N. H.

Boston Society of Civil Engineers.—Meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7.30 p. m.

Canadian Society of Civil Engineers.—Meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday at 8 p. m.

Central Railway Club.—Meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 10 a. m.

Chicago Electrical Association.—Meets at Room 1737, Monadnock Building, Chicago, on the first and third Fridays of each month at 8 p. m. J. R. Cravath, Secretary.

Civil Engineers' Club of Cleveland.—Meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

Civil Engineers' Society of St. Paul.—Meets on the first Monday of each month except June, July, August and September.

Engineers' Club of Cincinnati.—Meets at the rooms of the Literary Club, 25 East Eighth street, on the third Tuesday of each month, excepting July and August, at 6.30 p. m.

Engineers' Club of Columbus, (O.).—Meets at 12½ North High street on the first and third Saturdays from September to June.

Engineers' Club of Minneapolis.—Meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

Engineers' Club of St. Louis.—Meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

Engineers' Society of Western New York.—Holds regular meetings on the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

Engineers' Society of Western Pennsylvania.—Meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7.30 p. m.

Locomotive Foremen's Club.—Meets every second Tuesday in the club room of the Correspondence School of Locomotive Engineers and Firemen, 335 Dearborn street, Chicago.

Montana Society of Civil Engineers.—Meets at Helena, Mont., on the third Saturday in each month at 7.30 p. m.

New England Railroad Club.—Meets at Pierce Hall, Copley Square, Boston, Mass., on the second Tuesday of each month.

New York Railroad Club.—Meets at 12 West Thirty-first street, New York City, on the third Thursday in each month at 8 p. m., excepting June, July and August.

Northwest Railway Club.—Meets on the first Tuesday after the second Monday in each month at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

Northwestern Track and Bridge Association.—Meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

St. Louis Railway Club.—Holds its regular meeting on the second Friday of each month at 3 p. m.

Southern and Southwestern Railway Club.—Meets at the Kimball House, Atlanta, Ga., on the second Thursday in January, April, August and November.

Technical Society of the Pacific Coast.—Meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

Western Foundrymen's Association.—Meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is Secretary.

##### Engineers' Club of Philadelphia.

At the regular meeting of the Club October 7, an illustrated paper on "Long-Span Bridges" was read by Prof. Wm. H. Burr, of Columbia University, New York.

The Secretary announced the death of Mr. Walter D. Heston, active member, which occurred in Central America, while he was on a surveying trip, in the latter part of July.

##### St. Louis Railway Club.

The next meeting will be held in the parlors of the Southern Hotel October 13. Mr. W. W. Ryder, Superintendent Telegraph, C. & Q. RR., Chicago, will read a paper entitled, "The Railroad Telegraph its Uses and Abuses." The members are reminded



of the "Question Box Department" that it is to their personal interest to see that it keeps to the front by taking active hand in the matter.

#### Northwest Railway Club.

At a meeting of the Northwest Railway Club, at the West Hotel, Minneapolis, Minn., Tuesday, October 10, Mr. W. O. Johnson presented a paper, "A Study of Tool Steel in the Tool Room and Machine Shop." Papers presented at the last meeting were discussed. These were, "Rope Driving" by Prof. J. J. Flather, and "A Study of Cast Steel in the Blacksmith Shop," by Mr. G. F. Hinkens.

#### New England Railroad Club.

The regular meeting of the Club was held at Pierce Hall, Boston, Mass., Tuesday evening, Oct. 10. The constitution was amended to provide for an initiation fee of \$5 instead of \$2, as heretofore, the regular annual dues to remain at \$2.

Gen. William A. Bancroft, Vice-President of the Boston Elevated, gave a very interesting address on building the elevated structure in Boston, illustrated by stereopticon views.

#### Western Railway Club.

The next meeting of the Western Railway Club will be held Tuesday afternoon, October 17, at the Auditorium Hotel, Chicago. Mr. R. T. Shea, who has for some time past had charge of the introduction of piece-work methods in the shops of the Chicago, Burlington & Quincy system, will present a paper entitled, "Piece-Work in Railroad Shops." Mr. G. W. Rhodes, Assistant General Superintendent of the Burlington, will open the discussion of "The Advantage to Railroads in Adopting a Box Car of Typical Inside Dimensions," possibly advance copies of Mr. Rhodes' discussion will be sent out to members. This is a question which is now being considered by the American Railway Association. Then, Dr. J. E. Reynolds, who has charge of the Chicago Board of Health, will read a paper on the "Smoke Nuisance."

#### American Institute of Electrical Engineers.

The first regular meeting of the season was held at 12 West 31st Street, Wednesday, Sept. 27, with President Kennelly in the chair. The paper of the evening presented by Prof. W. Lisenard Robb of Hartford, Conn., was on "Series Arc Lighting from Constant Current Transformers," and a working model of the apparatus was shown which was heartily appreciated by the audience. Messrs. Fleming, Steinmetz, Hallberg and Mailloux discussed the paper. At the meeting of Council in the afternoon two associate members were elected and three were transferred to full membership. In order to satisfy the increasing demand for the final report of the Committee on Standardization, the Secretary was authorized to publish a special edition, which will be sold at a nominal price. All members of the Institute have already been supplied with copies in the regular edition of the Transactions.

#### Western Society of Engineers.

On Oct. 3 Prof. Edward E. Barnard, of the Yerkes Observatory of the University of Chicago, delivered a lecture before the Society at Steinway Hall, on "What Photography Has Done for Astronomy." About 350 members of the Society and ladies were present. After explaining that photographs of the celestial bodies were unknown when Richard A. Proctor did so much astronomical work, which he could only illustrate by crude drawings; and how the photographic plate is sensitive to lights not clear to the eye; and also touching upon the limitations of photography for astronomical work. Prof. Barnard showed a large number of very beautiful and interesting lantern slides from photographs taken at Hamilton, Lick, Harvard, Yerkes and other observatories in various parts of the world. At the close of the lecture Prof. Barnard was given a vote of thanks by the Society.

On Saturday, October 14, the Western Society will visit the University of Wisconsin, at Madison, on the occasion of the inauguration of Prof. J. B. Johnson, Dean of the College of Mechanics and Engineering. A special train of sleeping cars will be furnished by the Chicago, Milwaukee & St. Paul, which will leave Chicago Saturday morning and arrive at Chicago on the return Sunday morning.

#### The American Society of Civil Engineers.

A regular meeting of the Society was held Oct. 4. The ticket prepared by the Nominating Committee for officers to be voted for at the next annual meeting was reported as follows:

President, John Findlay Wallace, Assistant Second Vice-President Illinois Central Railroad, Chicago.

Vice-President, Rudolph Hering, Consulting Hydraulic and Sanitary Engineer, New York City.

Vice-President, Alfred Noble, Consulting Engineer, Chicago.

Treasurer, Joseph M. Knap, New York City.

Directors, District No. 1, John F. O'Rourke, Consulting Engineer and Contractor, New York City; Henry B. Seaman, Consulting Engineer, New York City.

District No. 4, Thomas H. Johnson, Chief Engineer, Pittsburgh, Cincinnati, Chicago & St. Louis Railway, Pittsburgh, Pa.

District No. 6, Henry B. Richardson, Chief State Engineer, New Orleans; Joseph Ramsay, Jr., Vice-President and General Manager Wabash Railroad, St. Louis.

District No. 7, George A. Quinlan, Vice-President and General Manager Houston & Texas Central Railroad, Houston, Tex.

At the same meeting the announcement was made that the Board of Direction had passed a resolution to discontinue the use of the 24-hour system of time notation in all of the publications of the Society. With this resolution the Board expressed the thanks of the Society to the Committee on Standard Time, which had for years striven to bring about this change in notation.

At the same meeting a paper by Mr. S. Bent Russell, of St. Louis, on "Impact Tests of Structural Steel," was presented and briefly discussed.

#### PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. Geo. A. Browne, Traffic Manager of the Richelleu & Ontario Navigation Co., died at Atlantic City, Oct. 2. Mr. Browne was 40 years of age.

—Mr. John C. O'Melveny, Chief Engineer of the Oregon Short Line, was shot and instantly killed by

Fred J. Mills, formerly Lieutenant-Governor of Idaho, on Oct. 3.

—Mr. William Dowd, for several years President of the Louisville, New Albany & Chicago, died Oct. 7. In 1877, Mr. Dowd was President of the Hannibal & St. Joseph. He also served as Second and Third Vice-President on the Missouri, Kansas & Texas.

—Mr. John P. Whitehead, Comptroller of the Atchison, Topeka & Santa Fe, died Oct. 7. Mr. Whitehead was born in London, England, in 1837. He entered the service of the Atchison in 1878 as Auditor, and five years later became Comptroller of the system.

—Mr. John Carter Newton, General Manager and Treasurer of the Hoosac Tunnel & Wilmington, died at Wilmington, Vt., Sept. 29. Mr. Newton was born at Greenfield, Mass., in 1838, and entered the service of the H. T. & W., as Treasurer in 1884. He was also General Manager of the Des Moines & Kansas City.

—Prof. J. B. Johnson, formerly of the Washington University, St. Louis, has, as we announced early in the summer, gone to the University of Wisconsin, where he becomes Dean of the College of Mechanics and Engineering. The ceremonies of his inauguration in that office are to be held at 7:30 p. m., Oct. 14.

—Mr. Thomas Lord Kimball, at one time Third Vice-President of the Union Pacific, died at Omaha, Neb., Oct. 9, aged 68. Mr. Kimball was a native of Maine and entered the service of the Union Pacific as General Passenger Agent. Later he became Assistant General Manager, General Traffic Manager, General Manager, and finally Third Vice-President.

—Mr. J. B. Gardiner, formerly Superintendent of the Stonington Division of the New York, New Haven & Hartford, died Oct. 8. Mr. Gardiner was born in 1831 at South Kingston, R. I., and began his railroad career with the New York, Providence & Boston. In 1873 he was appointed Assistant Superintendent and later Superintendent of the same road, in which position he continued several years after the line was consolidated with the New York, New Haven & Hartford.

#### ELECTIONS AND APPOINTMENTS.

Arkansas Southern.—W. J. Raef has been appointed Auditor, succeeding F. J. McLain, resigned.

Baltimore & Ohio.—Frank M. Johnson has been appointed Commercial Freight Agent, with headquarters at 434 Broadway, New York City.

Bangor & Portland.—The officers of this consolidated company referred to in the News column are: President, C. Miller, Nazareth; Vice-President, DeWitt C. Blair, Belvidere; Secretary, George W. Mackey, Bangor; Treasurer, John I. Miller, Portland. These, with C. Ledyard Blair and J. Isley Blair, New York City, and Charles N. Miller, Bangor, form the Board of Directors.

Bradford Central.—Geo. H. Adams was elected President of this company, now building (see RR. Construction column, Aug. 18, p. 588), succeeding A. F. Chapman, resigned. Wm. H. Kimball was elected a Director.

California Northwestern.—W. J. Hunter has been appointed Assistant Superintendent, with headquarters at Tiburon, Cal.

Calvert, Waco & Brazos Valley.—J. W. Byars is Superintendent, Auditor and General Freight and Passenger Agent, with headquarters at Calvert. The officers of this new company were given under Elections and Appointments, July 14, p. 514. (See RR. Construction column.)

Canadian Pacific.—A. C. Henry, heretofore Purchasing Agent, has been appointed General Purchasing Agent, and E. N. Bender, Assistant Purchasing Agent. H. L. Penny, heretofore Auditor of Disbursements, has been appointed General Auditor. John Leslie has been appointed Auditor of Disbursements, succeeding Mr. Penny. A. A. Goodchild has been appointed Assistant Auditor of Disbursements and O. J. Black Auditor of Agencies, effective at once.

Central Vermont.—W. J. Robertson, Master Car Builder, with headquarters at St. Albans, Vt., having resigned, the duties of that office will be assumed by C. E. Fuller, Superintendent Motive Power.

Chicago, Rock Island & Pacific.—Charles Brown has been appointed Trainmaster of the Keokuk & Des Moines Division, succeeding Wm. Given, transferred.

Cleveland, Cincinnati, Chicago & St. Louis.—C. A. Paquette has been appointed Superintendent, succeeding J. W. Riley, resigned, and C. S. Millard, formerly Assistant Engineer Maintenance of Way, has been appointed Engineer Maintenance of Way of the Peoria & Eastern (leased line of the C., C. & St. L.), succeeding Mr. Paquette, effective Oct. 2. Peter Daniels has been appointed Supervisor of Track of the Cincinnati Division, with headquarters at Springfield, O., of the C., C. & St. L., effective Oct. 3.

Cleveland, Lorain & Wheeling.—At the annual meeting of stockholders, held Oct. 3, E. W. Winter and A. E. Lang were elected Directors.

Columbia Southern.—The headquarters of President E. E. Lytle and Miss May Enright, Secretary, have been removed from Moro, Ore., to Portland, Ore.

Davenport, Rock Island & Northwestern.—The officers of this company are, President, H. B. Schuler; Vice-President, Frank P. Blair; Secretary and Treasurer, E. T. Schuler; Chief Engineer, C. E. Dearborn, and Traffic Manager, J. S. Keefe. (See RR. Construction column, Oct. 6, p. 701.)

Dakota Pacific.—The officers of this company, now building, are: President, Wm. T. Coade; Vice-President, Joseph H. Muhle; Secretary, Forrest Murdock; Treasurer, F. D. Gray; Chief Engineer, W. M. Wright. (See RR. Construction, Sept. 29, p. 685.)

Fitchburg.—G. J. Fisher, Purchasing Agent, with headquarters at Boston, Mass., has resigned.

Great Northern.—F. J. Hawn has been appointed Assistant Superintendent of the Montana Division, with headquarters at Havre, Mont., succeeding E. E. Lillie, transferred, effective Oct. 6.

Indianapolis & Fort Wayne.—The officers of this newly incorporated company are: President, S. E.

Rauh; Vice-President, A. Taggart, and Secretary and Manager, H. S. Smith. (See RR. Construction column, Oct. 6, p. 701.)

Lake Erie & Western.—At a meeting of the stockholders G. L. Bradbury and J. H. Seaman were elected Directors.

R. M. Case has been appointed Assistant General Passenger Agent, with headquarters at Indianapolis, Ind., effective Oct. 1.

Lehigh Valley.—The headquarters of Rollin H. Wilbur, General Superintendent, will be transferred to the Havemeyer Building, 26 Cortlandt St., New York City, effective Oct. 9. At a meeting of the stockholders Alfred Walter, President, was elected a Director.

Louisiana & Arkansas.—J. H. White has been appointed Superintendent, with headquarters at Stamps, Ark. The office of General Manager has been abolished.

Louisiana Eastern.—The officers of this company referred to in the Construction column are: President, W. W. Babbington; Vice-President, E. S. Ferguson; Secretary, P. B. Carter. The central office is Franklinton, La.

Mexican National.—Gaston C. Raoul has been appointed Purchasing Agent, with headquarters at 6 Wall St., New York City, effective Oct. 1.

Minneapolis & St. Louis.—At the annual meeting of stockholders General Manager L. F. Day was elected Vice-President, to succeed J. E. Searles.

Mobile & Ohio.—F. W. Birchett has been appointed Assistant General Freight Agent, with headquarters at 215 North Fourth St., St. Louis, Mo., and 351 Marquette Bldg., Chicago, Ill.

Philadelphia & Reading.—W. O. Taylor has been appointed General Road Foreman of Engines.

M. E. Blaine, Trainmaster at Reading, Pa., has resigned.

Quincy & Eastern.—The officers of this newly incorporated company (see RR. Construction column, Sept. 29, p. 685) are: President, L. B. Tebbetts; Vice-President and Treasurer, A. P. Decamp, St. Louis, Mo.; Secretary, M. K. Weems, and General Manager, T. A. Clark, of Quincy, Ill.

St. Louis, Iowa & Dakota.—The officers of this company, referred to in the Construction column, are: President, T. P. Gere, Sioux City, Ia.; Vice-President, H. P. Chesley, St. Louis, Mo.; Secretary, F. C. Hills, Sioux City; Treasurer, A. L. Stetson. The Directors are: S. M. Pickler, Kirksville, Mo.; F. Furst, Adair, Ia.; C. R. Benton, Dallas Center, Ia.; H. P. Chesley and F. C. Hills. (May 26, p. 379.)

St. Louis Southwestern.—M. L. Lynch has been appointed Chief Engineer, with headquarters at Tyler, Tex. The office of Resident Engineer is abolished.

San Francisco & San Joaquin Valley (A., T. & S. F.).—The officers of this company, including those mentioned under Elections and Appointments Sept. 1, p. 619, are: W. G. Nevin, General Manager; A. G. Wells, General Superintendent, with headquarters at Los Angeles, Cal., and W. B. Storey, Jr., Chief Engineer, with headquarters at San Francisco, Cal.

Santa Fe, Prescott & Phoenix.—Frank Davisson has been appointed Acting Master Mechanic, succeeding O. J. Jackson, Master Mechanic, resigned.

Wheeling & Lake Erie.—C. A. Van Dusen, heretofore Trainmaster at Massillon, O., has been appointed Acting Superintendent of the Cleveland Division, succeeding F. H. Keeshen, resigned. E. C. White has been appointed Acting Trainmaster of the Toledo Division, effective Oct. 1.

Woodstock.—At a meeting of the stockholders S. E. Kilner and J. G. Porter were elected Directors, succeeding Lewis Pratt and Norman Williams, deceased.

#### RAILROAD CONSTRUCTION. New Incorporations, Surveys, Etc.

ALABAMA ROADS.—H. F. De Bardeleben proposes to build a railroad to run from Cave Springs, Ga., on the Southern, south about five miles toward Cedartown, to tap rich mining lands bought by Mr. De Bardeleben and associates. O'Brien Bros., of Aniston, Ala., and J. D. Miller, of Birmingham, have the contract.

ANN ARBOR.—The annual report states with reference to the changes now in progress at Boon and Churchills, Mich., that the building of about six miles of the new main line will be necessary. This will eliminate all grades in excess of one per cent. (Aug. 11, p. 575.)

ARKANSAS & CHOCTAW.—Track is laid from Ashdown, Ark., via Rocky Comfort, to Choctaw City, Ark., 22 miles. The line is surveyed and cross-sectioned west through Indian Territory, via Dokesville and Goodland on the St. Louis & Southwestern, and Durant on the Missouri, Kansas & Texas, to Ardmore, I. T. Contracts are to be let for the entire work in January. (Oct. 6, p. 701.) W. H. Carson of Texarkana, Ark., is Assistant Manager; F. W. Valiant of Texarkana, Chief Engineer. (Official.)

ASHLAND & WOOSTER.—Track is laid from Ashland, O., via Jeromeville and Horace, to the Ashland and Wooster Junction near Shreve, 25 miles; also from Apple Creek to West Lebanon, O., 10 miles. The first 25 miles is in operation and trains will be running on the other 10 miles in a short time. (Sept. 29, p. 685.) H. B. Camp of Akron, O., is President. (Official.)

BALDWIN & MIFFLIN.—This company has been incorporated in Pennsylvania, with a capital stock of \$25,000, to build a railroad two miles long in Allegheny County, to connect the Union RR. and the Monongahela River & Streets Run RR. The Directors are: H. W. Croft (President), S. C. Walker, William Walker, Hay Walker, Jr., S. P. Harbison, Hamilton Stewart, J. B. Cullum, Pittsburgh, Pa.

BELLEFONTE CENTRAL.—Grading is reported practically completed and track laying in progress on an extension east about 1½ miles toward Scotia. It is stated that another 1½ miles is being built by the Central of Pennsylvania.

BOSTON & MAINE.—Concord and Montreal stock-



holders at the annual meeting held at Concord, N. H., Nov. 10, voted to increase the capital stock from \$300,000 to \$500,000 for building the Manchester & Milford extension from Manchester, N. H., southwest about 10 miles, via Bedford Center and Amherst, to Milford, on the Fitchburg. (Sept. 22, p. 667.)

With reference to the second track between Salisbury, Mass., and Greenland, N. H., 12 miles, the annual report states that it will require the separation of the line from 13 highway crossings. The total estimated cost is \$400,000. It is expected that the work will be completed not later than July 1 next. (Sept. 22, p. 667.)

**BURLINGTON, CEDAR RAPIDS & NORTHERN.**—According to Thomas H. Brown, General Town Site Agent at Sioux Falls, S. D., building is already begun on the extension from Worthington, Minn., northwest toward Canova, S. D. (April 25, p. 603.)

**CALVERT, WACO & BRAZOS VALLEY.**—The company is handling freight business into Calvert and expects to have the line open for general business between Oct. 15 and Nov. 1. (Aug. 11, p. 575.) It is building from Lewis Switch, Tex., on the International & Great Northern, north to Calvert, 15½ miles. Officers of the I. & G. N. are incorporators. (Official.)

**CAPE BRETON RAILWAY EXTENSION.**—This company, which was incorporated under special act of the Nova Scotia Legislature March 30 last, was organized Sept. 8. It proposes to build a railroad from Louisburg, on the east coast of Cape Breton Island, N. S., to run southeast 86 miles to Hawkesbury, on the Straits of Canso. It is proposed to use the harbor at Louisburg as a landing place for European mails, and the new line will form a connecting link to the Intercolonial at Hawkesbury for distributing mail to Canadian and United States points. Among the incorporators are John Crump, New York City; Chas. Corfield, Philadelphia; Joseph Shute, Atlantic City, N. J., and Lorenzo Shute and Herbert Dix, of Stanwick, N. J. The Vanderbilts are reported to be back of the enterprise.

**CHATTAHOOCHEE VALLEY.**—Brooks Bros. are reported to have the contract for building the extension from Glass, Ala., southwest 25 miles toward Columbus. Work was to be begun this week. L. Lanier, of West Point, Ga., is President. (Sept. 15, p. 650.)

**CHATTANOOGA, AUGUSTA & CHARLESTON AIR LINE.**—This company has been granted a charter in South Carolina for its line from Charleston to Augusta, Ga. The Georgia charter permits a further extension from Augusta to Chattanooga, about 210 miles. The road is in the interest of the Seaboard Air Line. (Sept. 29, p. 685.)

**CHATTANOOGA SOUTHERN.**—Officers have announced the intention of the company to make its proposed extension from Gadsden, Ala., south about 125 miles to Montgomery, with a branch from the main line to Birmingham, 45 miles. (Nov. 5, 1897, p. 790.)

**CHICAGO & NORTHWESTERN.**—Track laying was completed Oct. 6 on the extension from Sanborn, Minn., to Burt. Much of the surfacing is completed and the telegraph wires strung over most of the line. It is the intention to have trains running regularly by Nov. 1. (June 30, p. 482.)

Track laying is begun at Blue Earth City, Minn., for the extension from Belle Plaine northwest to that city. Grading between Blue Earth and Mason City, Ia., is practically completed, and it is expected to have rails laid on this section before the first of the year. The contract is let for grading from Blue Earth to Fox Lake, Minn., where it will intersect with the Burt-Sanborn extension. (Aug. 18, p. 588.)

**CHICAGO GREAT WESTERN.**—The extension of two miles in Faribault, Minn., is reported practically completed. The contract, under John Grant, of Faribault, calls for the completion of the line by Oct. 15. (Sept. 8, p. 633.)

**COLUMBIA SOUTHERN.**—A. Mason of Portland, is reported to have the contract for the extension from Moro, Ore., south 43 miles toward Prineville. (Sept. 29, p. 685.)

**COLUMBUS, LIMA & MILWAUKEE.**—Contracts are to be let soon for 60 miles more of this line, which is practically completed from Kalida, O., via Continental, to Defiance, 40 miles. There are 80 men and 20 teams at work. (May 19, p. 359.) The road as projected is from Columbus, O., via Lima and Defiance, to Saugatuck, Mich., 285 miles. C. T. Hobart of Defiance is Chief Engineer. Norton & Turstull of 33 Wall St., New York, are Eastern representatives. B. C. Faurot of Lima, O., has the general contract. (Official.)

**COLUMBUS, MARSHALL & NORTHEASTERN.**—Joshua Brown & Co., New York, offer \$450,000 first mortgage 5 per cent. gold bonds of this company for its line now building from Marshall, Mich., north 125 miles, via Olivet, Kalamazoo, Vermontville and Alma to Bay City. In the prospectus it is stated that over \$150,000 has been already expended in grading the roadbed, and that the first section from Marshall north to Messenger, on the Grand Trunk, is about completed. (Oct. 6, p. 701.)

**CRIPPLE CREEK.**—Surveys were to be completed about Oct. 10 for this line from Cripple Creek, Colo., north 35.3 miles to Canyon City. Bids for rails and rolling stock will be asked about Oct. 20. A. H. Crocker, Boston Bldg., Denver, Colo., is General Manager. (April 28, p. 305.) H. B. Twombly of 115 Broadway, New York, is Secretary. (Official.)

**DELAWARE & HUDSON.**—Preliminary surveys have been made, according to report, for a branch line from Moreau, N. Y., to run via Baker's Falls to South Glens Falls, about four miles.

**DELAWARE, LACKAWANNA & WESTERN.**—Plans are now being prepared for improvements in the yards at Hoboken, N. J. The present building, which has been occupied as an office building for many years, will be removed. A new structure is proposed on the opposite side of the yard. The main tracks will be shifted so as to pass around the south side of the roundhouse and then direct into the train shed, passing over the ground where the old office building now stands. This will do away with a sharp curve that begins at the Henderson St. bridge.

**DULUTH & NORTHERN MINNESOTA.**—The company has completed 12 miles of main line and six miles of branches, besides sidings. There is also

five miles more graded. Work is about over for the season. There are 100 men grading and 50 men bridge building. The road as projected is from Knife River, Minn., on the Duluth & Iron River, north into lumber camps. (Aug. 4, p. 561.) M. S. Smith of Alger, Smith & Co., Detroit, is President. (Official.)

**EAST & WEST.**—The company officials are at work procuring rights of way, depot grounds, grants of land, etc., for this proposed line from Port Harford, Cal., on the Pacific coast, to run east to the San Joaquin Valley. (July 28, p. 547.) R. E. Jack of San Luis Obispo, Cal., is interested. (Official.)

**EAST CAROLINA.**—The proposed route of this line is from Tarboro, N. C., south 35 miles via Macchesfield, Farmville and Castoria to Snow Hill. It is completed from Tarboro to Davis, seven miles. (July 29, p. 555.) H. Clark Bridgers of Tarboro is President and I. H. Gatlin, Jr., Chief Engineer. (Official.)

**EL PASO & NORTHEASTERN.**—Track is reported laid into White Oaks, N. M. This completes the line from El Paso, Tex., about 200 miles. (Sept. 22, p. 668.)

**ELWOOD, ANDERSON & LAPEL.**—Right of way is reported secured for this proposed line from Elwood south about 20 miles to Lapel, on the Chicago & Southeastern. The American Tin Plate Co., D. G. Reid, of Elwood, President, is supposed to be back of the plan. The company is said to control also the Chicago & Southeastern.

**ERIE.**—Plans are being prepared for abolishing the grade crossings at the Park St. station, Montclair, N. J.

This company, in conjunction with the Pennsylvania, is building a switch yard west of Youngstown, O., to accommodate the National Steel Co.

**FARMINGTON & BIG RIVER VALLEY.**—This company has been incorporated in Missouri, with a capital stock of \$250,000, to build a railroad from Farmington northwest about 20 miles, via Taylors and Desloge, to Irondale, on the St. Louis, Iron Mountain & Southern line of the Missouri Pacific. The incorporators are Geo. J. Cole, P. S. Cole, J. T. Foster, A. F. Nixon and M. R. Smith.

**FRANKLIN, SOMERSET & KENNEBEC.**—L. Atwood, of Farmington, Me., is reported making surveys for the section of the line from New Sharon, via Mercer, to Oakland. The line is projected from Farmington south 50 miles to Augusta, and north 25 miles to Attean. (Dec. 20, 1898, p. 938.)

**GILA VALLEY, GLOBE & NORTHERN.**—An officer confirms the report that surveys are in progress from the present terminus at Globe, Ariz., to run northwest about 20 miles via the Black Warrior and Continental mines to Pinto Creek. As soon as the grades and curvature are determined, with the approximate cost, the advisability of building will be decided. (Sept. 22, p. 668.)

**GRAND TRUNK.**—Surveys were begun Oct. 5 for improving the grades and double tracking from Hamilton, Ont., to Niagara Falls. This special work has been under consideration for some time, and the company has been putting in stone abutments to bridges of double width. It is expected that the contract for widening the roadbed, track laying, etc., will be let during the winter, and that building will be begun early in the spring. The road is already double tracked from Toronto to Hamilton. It is expected that other sections between Hamilton and the St. Clair River Tunnel will be similarly improved later.

**GULF & MANITOBA.**—Grading is reported completed between the Minnesota River and Beaver Falls, Minn., on this road from a point on the Iowa State line, via Jackson, Ia., to Sauk Center, and thence to Duluth, Minn. E. E. Carpenter of Canton, S. D., is an incorporator.

**HARDY CREEK & EEL RIVER.**—This company was incorporated in California Sept. 19, with a capital stock of \$75,000, to build a railroad from Hardy Creek wharf, Mendocino County, near Westport, to run east 12 miles to the South Fork of Eel River. The incorporators are: C. A. Hooper, E. F. Burrell, W. G. Tibbetts and D. C. Henry, Alameda, Cal.; G. W. Hooper, San Francisco, Cal.

**GREAT NORTHERN.**—A third survey has been made, according to report, for a line from St. Bonifacius, Minn., to run northeast about six miles to Spring Park, on Lake Minnetonka.

**IDAHO ROADS.**—A company has been incorporated in this State to build a line from the mouth of the Boise River, in Canyon County, easterly along that stream 17 miles to the mouth of Moore's Creek; thence east along the South Fork of the Boise 55 miles to Pine Grove; northeast along the same fork 30 miles to the mouth of Little Smoky Creek, in Blaine County; northeast along Big Smoky Creek 14 miles to Vienna; north along Salmon River 26 miles to Red Fish Lakes; thence 16 miles to the mouth of Yankee Fork branch of the Salmon; east along the same river 20 miles to Clayton; northeast 22 miles to Challis; north 50 miles to Salmon City; northwest 22 miles to the mouth of the North Fork of the Salmon; northeast along the North Fork to Gibbonsville, Lemhi County, 12 miles, and northeast through that county 20 miles to the summit of the Rocky Mountains, near the State line between Idaho and Montana. There are to be several branches, as follows: From a point on the main line near the mouth of North or Middle Fork of Boise River, to Atlanta, 40 miles; from near the mouth of Yankee Fork of the Salmon, north 20 miles to Custer City; from Challis southeast to Houston, 40 miles, making the total length of the main line and branches about 404 miles. Thomas W. Bates, of Weiser, Idaho, is the principal projector.

**IOWA & MISSISSIPPI VALLEY.**—The Chief Engineer of the Muscatine North & South has begun surveying, according to report, for this line from Elrick, Ia., terminus of the M. N. & S., to run south about 23 miles to Burlington. W. R. Stewart, of Elrick, President of the M. N. & S., is President. (July 7, p. 499.)

**KANSAS CITY, HOT SPRINGS & NEW ORLEANS.**—Right of way is being obtained for this proposed line from Hot Springs, Ark., northwest about 90 miles through the counties of Gerland, Perry, Yell and Scott, via Waldron, to Mansfield, on the St. Louis & San Francisco. C. Donoghue and P. J. Ledwidge of Hot Springs are incorporators. (March 10, p. 179.)

**LOUISIANA EASTERN.**—This company has been incorporated in Louisiana to build the East Louisiana extension from Covington, north about 25 miles to Franklinton. Surveys are to be begun next month. The officers are given under Elections and Appointments.

**LOUISVILLE & NASHVILLE.**—M. H. Smith, President of the L. & N., was at Birmingham, Ala., recently in consultation with F. M. Jackson, President of the Alabama Consolidated Coal & Iron Co., for the building of four miles of track to the new coke ovens of that company at Brookwood, Ala.

**M'CLOUD RIVER.**—California reports state that the extension from McCloud east about 70 miles to Altruras is to be built as rapidly as possible. The company built from Upton east 18.32 miles to McCloud about a year ago.

**MISCELLANEOUS COMPANIES.**—The Knoxville Construction Co. has applied for a charter in Tennessee, with a capital stock of \$25,000, to build railroads. The first work will be the Knoxville & Bristol extension toward Knoxville. The incorporators are: H. M. Aiken, W. H. Kephart, J. C. White, B. Braine and J. W. Caldwell. (K. & B., Sept. 29, p. 685.)

**MISSOURI, KANSAS CITY & EASTERN.**—This company has filed its incorporation in Illinois for the proposed extension from Quincy, Ill., east to Chandlerville, with a branch to Springfield. (Sept. 22, p. 668.)

**MOBILE & WEST ALABAMA.**—The citizens of Choctaw, Ala., are ready to give \$10,000 toward this line, provided it runs through their city. It is proposed from Mobile, Ala., north 350 miles, via Tuscaloosa, to Florence. H. A. Austill, of Mobile, is President.

**MORENCI SOUTHERN.**—The road of the Detroit Copper Co. is to be built under this title. It is to run from Morenci, Ariz., south 20 miles to the Arizona and New Mexico line at Guthrie. The Directors are members of the Phelps-Dodge Co., of New York, which owns the copper mines. (Arizona Roads, Sept. 22, p. 667.)

**MT. PLEASANT, TENNESSEE RIVER & MILAN.**—This company has been incorporated in Tennessee to build a railroad from Mt. Pleasant, to run northwest about 55 miles to the Tennessee River. Among the incorporators are J. H. Cunningham and J. H. Fussell.

**NASHVILLE, CHATTAHOOCHEE & ST. LOUIS.**—The annual report states that the Middle Tennessee & Alabama has been extended 4.18 miles from Jeff, Ala., south to the Limestone County line, and was to be completed by Oct. 1, 2.03 miles additional to Limestone Creek, 36.6 miles from Fayetteville. This leaves only 13.6 miles to be completed to the junction of the Southern Ry., near Decatur, Ala. (June 30, p. 483.)

**NEW YORK, NEW HAVEN & HARTFORD.**—Extensive improvements are reported determined upon at Webster, Mass. These will include the increase to four tracks.

**OREGON RAILROAD & NAVIGATION.**—Track is reported laid for 47 miles on the Snake River Valley extension from Wallula Junction, Wash., northeast 65.7 miles to Grange City. Coykendall & Shields of Wallula, Wash., have the general contract. The road is to be extended still further to Lewiston, Ida., in all 137.2 miles. (June 2, p. 393.)

**PACIFIC & IDAHO NORTHERN.**—Smith, Nelson & Doran of Portland, Ore., have secured a contract for 16 miles of grading on this line from Weiser, Ida., north 192 miles to Lewiston. Lucius G. Wilkinson of Weiser, Ida., is interested.

**PENNSYLVANIA.**—Arrangements are being made, according to report, for an extension from Indiana, Pa., northwest about 20 miles through Shelocta.

Application has been made to the Board of Port Wardens of Philadelphia for permission to make a number of changes along the water front.

The Greenough Coal Co. is reported to have made arrangements with the P. R.R. for building a branch road about one mile long from the main line to the Greenough Colliery, near Shamokin, Pa.

**RALEIGH & EASTERN.**—Surveys are begun for this line recently incorporated in North Carolina, to build from Raleigh northeast about 20 miles through Wakefield and Earpsboro. E. B. Barbee of Raleigh is a stockholder. (April 26, p. 603.)

**RIO GRANDE WESTERN.**—Surveys are reported in progress for grade reductions between Salt Lake City, Utah, and Park City.

**ST. LOUIS, ALTON & CARONDELET.**—This company has been incorporated in Illinois, with a capital stock of \$100,000, to build a railroad from a point opposite the mouth of the Missouri, to run south about 10 miles to Granite City and Venice, opposite St. Louis. Edward C. Cameron of St. Louis is one of the Directors.

**ST. LOUIS, IOWA & DAKOTA.**—At the annual meeting of the stockholders, held Oct. 6, at Sioux City, Ia., it was announced that almost all the preliminaries have been completed and that building will probably be begun early in the spring. The road as proposed is from Sioux City, Ia., southeast 512 miles to St. Louis, Mo. The officers are given under Elections and Appointments.

**SHAWNEE, OKLAHOMA & INDIAN TERRITORY.**—Surveys are to be begun in 30 days, and grading about three months later, on this line from Wichita, Kan., south via Shawnee, Okla., to Denison, Tex., with a branch to run east via McAlester, I. T., to Texarkana, Ark. The contract was signed Oct. 4 for the money needed in building. (Sept. 8, p. 633.) C. N. Points of Shawnee, Okla. Ter., is President. (Official.)

It is reported that the Wichita & Southern, which proposes to build from Wichita south via South McAlester, I. T., to Denison, Tex., is to unite its interests with the above company.

**SHREVEPORT & RED RIVER VALLEY.**—Surveyors are reported at work north of Pineville, La., for the southeastern extension of the road, which is now completed from Coushatta, La., southeast 73 miles to Luella. (Jan. 6, p. 16.)

**SOUTHERN.**—Preliminary surveys are reported in progress for an extension from Johnston, S. C., north about 12 miles to Saluda.



The 65-lb. rails of the North Carolina line are to be replaced with 85-lb. steel and the track ballasted with crushed stone.

Surveys are reported in progress for a cut-off about six miles long between Cleveland, Tenn., and McDonalds. It will require several bridges.

**SOUTHERN PACIFIC.**—Surveys are reported in progress at Salinas, Cal., for switch yards and other improvements.

Roberts, Sherer & Co., of Los Angeles, Cal., have taken the contract for improving the line between Santa Barbara and Ellwood, Cal. (March 10, p. 180.)

Track laying is reported in progress on the spur at Madera, Cal., to the Italian-Swiss Colony. (July 29, p. 548.)

Orders have been given, according to report, to begin building the improvements at Galveston, Tex., including the enlargement of terminal facilities and double tracking the bridge across Galveston Bay and new wharves. (June 23, p. 462.)

**SUMPTER VALLEY.**—J. A. West, Chief Engineer of the Utah & Pacific, has completed his preliminary survey for the proposed extension of this line from Sumpter, Ore. southwest 20 miles. The road will probably be built next year.

**TENNESSEE CENTRAL.**—E. A. Wilder, Locating Engineer, is reported at Monterey, Tenn., surveying for a route from that city to Nashville. Grading is completed between Harrison and Monterey, 80 miles, and much of the track is laid. (Sept. 1, p. 620.)

**UNION PACIFIC.**—Deal Bros. & Mendenhall, of Springville, Utah, have the contract for grading the spur, about two miles long, from Park City, Utah, to the mouth of the Ontario drain tunnel. (Oct. 6, p. 702.)

**VICTORIA & PORT ANGELES TERMINAL.**—This company has been organized and a petition will be made to the Dominion Parliament at its next session to incorporate the company to provide terminal facilities at Victoria, B. C., and to connect the island with the mainland.

**WISCONSIN CENTRAL.**—The company has put on a night force to hasten the building of new yards at Fond du Lac, Wis.

#### GENERAL RAILROAD NEWS.

**BALTIMORE & OHIO.**—The reorganization managers give notice to holders of Central Ohio 4 per cent. bonds, Sandusky, Mansfield & Newark 7 per cent. bonds, Columbus & Cincinnati Midland 4 per cent. bonds, Newark, Somerset & Stratsville 5 per cent. bonds, Pittsburgh Junction first mortgage 6 per cent. bonds, second mortgage 5 per cent. bonds and preferred stock, and Pittsburgh Junction Terminal 5 per cent. bonds, that pending the delivery of the new Pittsburgh Junction and Middle Division first mortgage 3½ per cent. gold bonds, the managers have arranged to advance the cash payments to which the holders of such certificates of deposit will be entitled under the plan, together with the interest upon the new bonds up to Nov. 1. These cash payments are payable on and after Oct. 9. (May 19, p. 361.)

**BANGOR & PORTLAND.**—A joint agreement consolidating the Nazareth & Lehigh with this company was filed at Easton, Pa., Oct. 4. The new company is to have a capital stock of \$510,000. The N. & L. proposes to build a line from Nazareth, Pa., to connect with the Lehigh Valley and the Central of New Jersey at Allentown or Bethlehem. The officers and directors are given under Elections and Appointments. (Sept. 1, p. 620.)

**CENTRALIA & CHESTER.**—The U. S. Court of Appeals has reversed the decision of Judge Grosscup, rendered at Springfield, Ill., April last, in the suit of the Farmers Loan & Trust Co., with reference to the Receivers' certificates. By the latest decision, \$176,000 of Receivers' certificates held by the Equitable Trust Co. are to be a second lien as against the bonds. W. S. Ingraham, of Bristol, Conn., holding \$100,000 of bonds, and Robert B. Rodman, of Lafayette, N. J., holding \$200,000 of bonds, are deprived of participating in any surplus in excess of the remaining surplus held by the Equitable Trust Co. (April 21, p. 291.)

**CENTRAL PACIFIC.**—Speyer & Co., New York, have deposited with the United States Treasury first mortgage bonds of the company to the amount of \$47,056,000 to secure the payment of 16 notes aggregating \$47,050,172. Under the agreement between the reorganization committee and the Government 20 notes were to be executed for an aggregate of \$58,812,715, payable semi-annually, and bearing interest at 3 per cent. The committee took up four of these notes at once. (Sept. 29, p. 686.)

**CHICAGO, ROCK ISLAND & PACIFIC.**—Holders of Chicago & Southwestern first mortgage 30-year 5 per cent. bonds, due Nov. 1, are notified that the same will be paid at the office of the Central Trust Co., New York, on that date. (Feb. 3, p. 95.)

**CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.**—With reference to the reported change in the control of this property, Samuel Spencer, President of the Southern, says:

There have been no recent changes except that the receivership has been lifted. The company is not controlled by the Southern. It is controlled chiefly by the Cincinnati, Hamilton & Dayton, and interests represented by the Southern, and is being operated under their joint control. (Oct. 6, p. 702.)

**DELAWARE & HUDSON.**—The New York Court of Appeals on Oct. 3 decided against the Adirondack Railway Co., in its suit to obtain right of way through the public lands of the Adirondacks for its proposed line from North Creek, N. Y., northwest about 50 miles to Tupper Lake. Some time ago Justice Chester in the Supreme Court decided against the company, but later the Appellate Division gave the company the privilege of a new trial. (March 17, p. 200.)

**DULUTH, ST. LOUIS & KANSAS CITY.**—Receiver Hunt has been authorized to spend \$80,000 in discharge of receiver's certificates. There are \$280,000 of these certificates outstanding, which will leave \$200,000 due. (Aug. 18, p. 590.)

**GULF & INTERSTATE.**—This property, according to report, has been sold to representatives of the Gulf, Beaumont & Kansas City, and application is made to the Texas Railroad Commissioners to op-

erate the two properties under one control. The Gulf & Interstate has been completed from Port Bolivar to Beaumont, Tex., 70 miles. It is also stated that the Galveston, Brazos & Southwestern, which is graded from a point on the Gulf, Beaumont & Kansas City, near Galveston to Chenango, is to form part of the system.

**KANSAS CITY & NORTHERN CONNECTING.**—This company has filed a statement increasing its capital stock from \$3,000,000 to \$3,500,000.

**LOUISVILLE & NASHVILLE.**—The stockholders at the annual meeting on Oct. 4, assented to the releasing of the Nashville & Decatur, the selling to the Southern Alabama of the Pensacola & Selma, the purchase of the Southern Alabama and the assumption of the entire lease of the Georgia. (Sept. 15, p. 650.)

**PORTSMOUTH & DOVER.**—The stockholders at Portsmouth, N. H., Oct. 10, voted to sell stock to the Boston & Maine. The line runs from Portsmouth to Dover, 10.88 miles, and has been leased since its completion in 1874 to the Eastern Railroad of N. H., and guaranteed by the B. & M., at an annual rental of 6 per cent. on the \$679,000 capital stock. (B. & M., May 26, p. 380.)

**SEABOARD AIR LINE.**—Stockholders of the Chesapeake & Kershaw have authorized a mortgage for \$500,000 to the Richmond Trust & Safe Deposit Co., as trustee, for the link from Cheraw to Camden, to be completed Jan. 1, 1900.

**SIOUX CITY & NORTHERN.**—At Sioux City, Oct. 3, Judge Shiras of the Federal Court made an order for the foreclosure sale of the property. It was incorrectly stated last week (p. 702) that the property was taken from the hands of the receiver.

**TEXAS & PACIFIC.**—Eastern Division first mortgage bonds of May 15, 1875, to the value of \$105,000, have been drawn for payment at par for the sinking fund at the Mercantile Trust Co., New York, interest to cease after March 1, 1900.

**UNION PACIFIC.**—At a special meeting of the stockholders, held at Salt Lake City, Utah, Oct. 9, it was voted to increase the preferred stock from \$75,000,000 to \$100,000,000, and the common stock from \$89,460,100 to \$96,178,700. The additional \$25,000,000 preferred and \$7,718,600 common is to be used in exchanging for the stock of the Oregon Short Line. (Sept. 8, p. 634.)

**WISCONSIN CENTRAL.**—The Milwaukee & Lake Winnebago gives notice that all its Manitowoc Division first mortgage bonds of 1895 are called for payment at the office of Maitland, Coppel & Co., New York, on Oct. 1, 1900, at 110 per cent. and interest. The firm offers to buy the same on presentation, at 110 and accrued interest. (July 7, p. 500.)

#### TRAFFIC.

The Northern Pacific, since the organization of the present company in September, 1896, has issued 5,058 freight tariffs.

The Union Pacific has made a trackage contract with the Chicago, St. Paul, Minneapolis & Omaha by which it will run freight trains to and from Sioux City, Ia.

On Saturday, Sept. 30, the number of freight cars moved over the Middle Division of the Pennsylvania Railroad was 6,001, the largest movement for a single day in the history of the road.

Eastbound grain rates, all-rail, will be advanced from 4 cents to 6 cents Nov. 1. Ocean rates to Europe are advancing in consequence of the use of large numbers of vessels by the British Government to transport troops to South Africa.

The low rates on freight from New York to Kansas City by steamer to Galveston and thence over the Kansas City, Pittsburgh & Gulf, which have been in force several months, will be abolished Oct. 16 and the old tariff of \$1.37 (first class) will be restored.

#### The Federal Industrial Commission.

At the hearing before the Industrial Commission at Washington, Oct. 5, Interstate Commerce Commissioners Knapp, Clements and Prouty gave testimony concerning the railroad rate situation. Mr. Knapp thought that the Interstate Commerce Law could be amended so as to kill out the evil of free passes. He recommended the repeal of the anti-trust law and the anti-pooling law, but would have more stringent regulation of railroad traffic contracts. Mr. Knapp spoke of government ownership of railroads, holding that to change to that plan would not stop discrimination. Mr. Clements called attention to the fact that in making unreasonably high rates to short distances points the railroads were virtually violating the long and short haul sections of the Interstate Commerce law. Mr. Prouty expressed the opinion that rates were now being cut on a number of important roads.

On Saturday Freight Commissioner A. J. Vanlandingham, of the St. Louis Traffic Bureau, gave testimony related to the alleged discriminations of the railroads as they affect St. Louis. He stated that rates had been fairly well preserved in 1899. He said that all grain shipped by favored shippers to Chicago is given the benefit of the export rate, which is 3.2 cents less than the domestic rate. The favoritism shown by the Western railroads to certain elevators had, he said, been carried to an extent that enabled five Chicago firms to control 85 per cent. of the export grain business of the West. The difference in the rate on flour from that on grain, due to the development of the Gulf ports, had resulted in a marked discrimination amounting to 7 or 8 cents on the hundred, and was due to the fact that wheat in bulk could be more readily supplied than flour. This difference was too great. There had been an increase of only 5 per cent. in the flour exportation of 1898, compared with an increase of 85 per cent. in the exportation of wheat. Mr. Vanlandingham said that the greatest violators of the Interstate Commerce act were roads in the hands of receivers. Having no interest to pay, they generally were disposed to take business at a lower rate than other lines. He said the greatest defect in railroad regulation was the inability to secure legal relief in case of abuse. The Interstate Commerce Commission findings not being binding on the railroads, shippers had almost ceased to apply to the Commission except in the hope of developing more information than was otherwise procurable. He suggested several amendments to the Interstate Commerce law, includ-

ing one giving the Commission power to enforce its findings and to reduce rates in certain cases. He would also have export rates made public and he was opposed to pooling.

Mr. N. B. Kelly, Freight Commissioner of the Trades League of Philadelphia, gave testimony concerning the export grain business. He thought a lower rate for export than for domestic grain was justified, being necessary to give the farmers a good market. He favored the legalization of pooling.

On Monday President S. R. Callaway of the New York Central was before the Commission. Mr. Callaway said that since he had been connected with the Central there had been no troubles with the employees. No objection was made on the part of the management to labor organizations or to arbitration of differences except on vital questions, but there was, he thought, little utility in a law like the present Federal statute, which provided no means for compelling compliance with the findings of an arbitration board. He would not, however, want to arbitrate the question of wages, as a slight advance on the general payroll, amounting to \$17,000,000 a year, would make a material difference in the company's income. He said that the differential rate awarded to Philadelphia and Baltimore twenty years ago had been responsible for much of the complaint of discrimination. Whatever reason there had been originally for this advantage to those cities, it did not now exist, and he thought it would be eventually wiped out. Ticket brokerage, the witness characterized as "the most demoralizing business in the country." He was also opposed to the granting of passes, and so far as he could control the practice, he had limited it to employees. Ownership of freight cars by shippers and other outsiders was also characterized as bad, but the competition was such that he saw for the present no way of remedying the evil. Rates on freight for export were made cheaper than for domestic consumption to meet competition, and he did not consider the practice injurious to any one. He favored the legalization of pooling, saying he did not believe that under the present circumstances such authority would result in a general increase of freight rates. He thought any suggestions made by the Commission would be heeded, but he did not think it would be practicable for a commission, sitting at any one place, to fix rates intelligently and with justice. He did not, however, admit that the Government had any more right to interfere with the management of a railroad than with any other business. He did not believe Government ownership of railroads was practicable.

#### To Prevent Fraudulent Use of Tickets.

One more scheme is being tried at Chicago for keeping the scalpers in check, where large numbers of return excursion tickets are being offered for sale by passengers. It will be remembered that the somewhat costly perforating dies used a year or two ago to punch through a ticket large letters making up a cipher word good for only one day proved to be only partly effective, the scalpers having succeeded in getting counterfeit perforating dies made quickly after learning the cipher word for a given day, so as to be able to use them on the same day that that cipher word was valid. Mr. Fort, Secretary of the Central Passenger Association, has now devised a stamp with which to emboss letters and figures on a ticket, and this, it is thought, will be more successful. The embossed letters are of distinctive and elaborate design and the design has been copyrighted. Not only this, but all stamp and die makers and ticket sellers have been warned that infringement of the copyright will be prosecuted in the United States Courts.

#### Chicago Traffic Matters.

Chicago, Oct. 11, 1899.

All things point to a battle in trans-Continental time during the coming winter, as the Santa Fe's California line means competition. But there will probably be no ruinous bickering for business; the competition will take the form of time and equipment contests. In this line the ball already has been opened by the Southern Pacific before the Santa Fe is ready. The S. P. will on Oct. 15, accelerate its best passenger train to Ogden, the "Overland Limited," from San Francisco, so that it will run to Chicago in just 71 hours, which is several hours shorter than at present. The "Overland Limited," westbound, will leave Chicago daily at 6.30 p. m. and arrive at San Francisco at 4.45 p. m. of the third day, covering the distance in 72 hours. Returning the corresponding train will leave at 8.30 a. m. and reach Chicago at 9.30 a. m. of the third day. Officers of the Santa Fe say they expect to have their California limited running to San Francisco by Jan. 15.

Officers of the Central Passenger Association believe that they have at last struck something that will seriously check the scalping of return parts of excursion tickets. It is their copyrighted seal [described above]. So far as can be learned, this is the first time that a ticket stamp has been copyrighted. The seal has just finished a week's experiment in this city, with about 15,000 tickets, being the returns of round-trip transportation sold from Eastern points 200 miles outside of Chicago. This being the initial trial of the seal a large force of men kept close watch of the scalpers, but no attempt was made to duplicate it. Of course there were attempts to scalp the tickets, but these were after they had been stamped and sealed by the joint agent, but as this operation was performed in each case only a few hours before the departing time of the holder, manipulation was reduced to a minimum.

Freight rates in the Western territory are in very fair condition. The lack of cars to handle the business is now the bane of the traffic and operating departments. In Chicago there is a general blockade. Side tracks reaching far into the country are being utilized by the Western roads to store arrivals, and there is much delay in transferring traffic between the Western and Eastern roads through or around the city.

In passenger rates the eastbound roads appear to be behaving themselves well. Among the Western roads, however, the war that was begun two or three weeks back is only suspended because the rates authorized for the celebration in this city the 9th are lower than the reductions that were made in regular tariffs. These excursion rates will end next week. One hopeful thing is the application of the Chicago Great Western for membership in the Western Immigrant Clearing House.

The Central Traffic roads are now considering the advisability of agreeing upon a uniform charge for the transportation of bicycles. At present several roads check them free, while others make a charge. It is proposed to make a uniform charge of 6 per cent. of the first class ticket fare for the service.